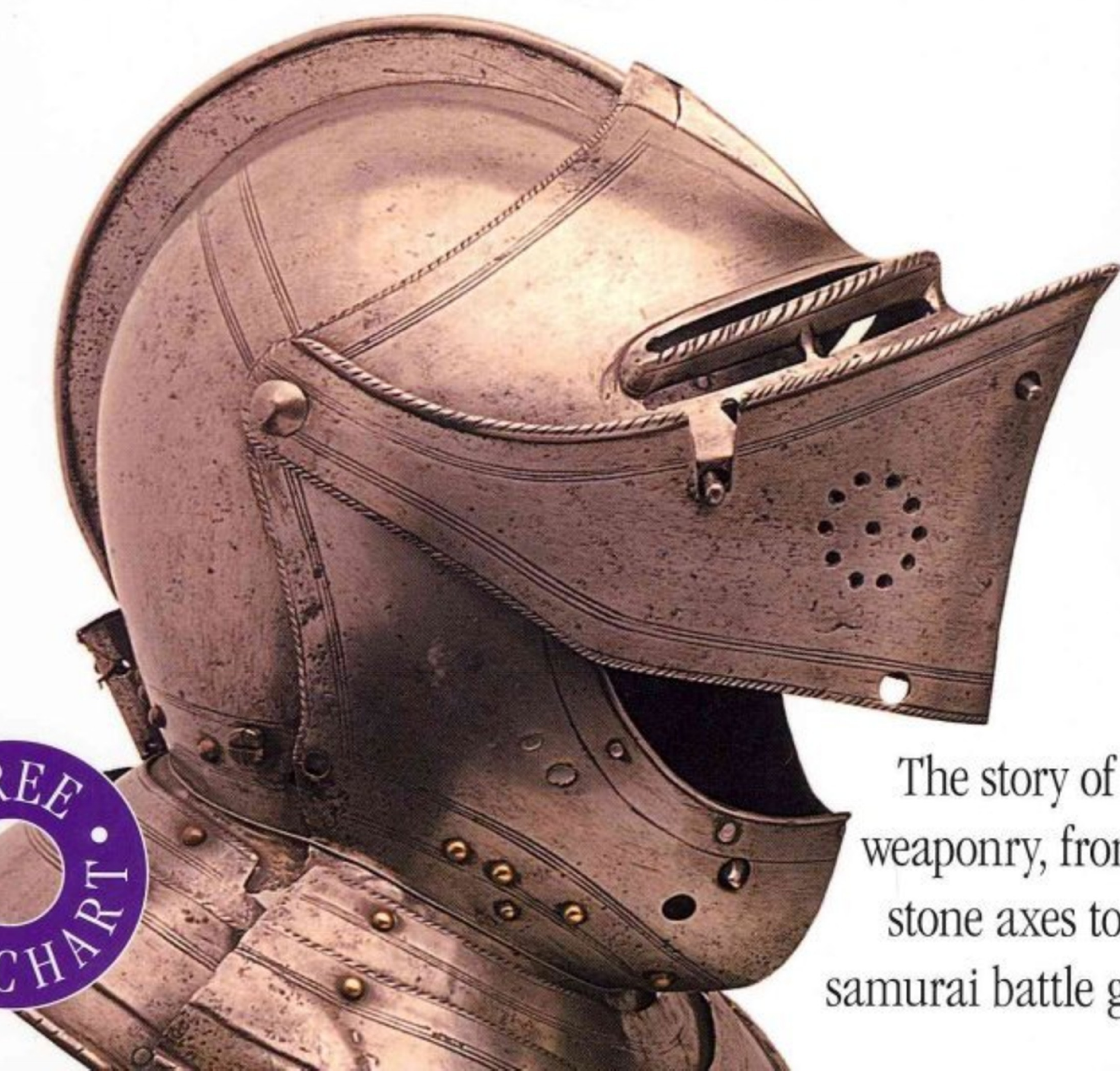




Eyewitness



# ARMS & ARMOUR



The story of  
weaponry, from  
stone axes to  
samurai battle gear







# Eyewitness ARMS & ARMOUR





Silver-hilted  
robe sword,  
c. 1710



Flintlock pocket  
pistol, c. 1770



Rapier, c. 1625



Silver-hilted  
hunting sword,  
c. 1750



Flintlock  
"Tower" pistol,  
c. 1800



Pepperbox revolver,  
c. 1855



Medieval dagger, c. 1400



Gauntlet, c. 1580







Pinfire revolver,  
c. 1860



Cartridges,  
c. 1850

# Eyewitness ARMS & ARMOUR

Written by  
MICHELE BYAM

Indian knife  
with jade hilt,  
c. 1800



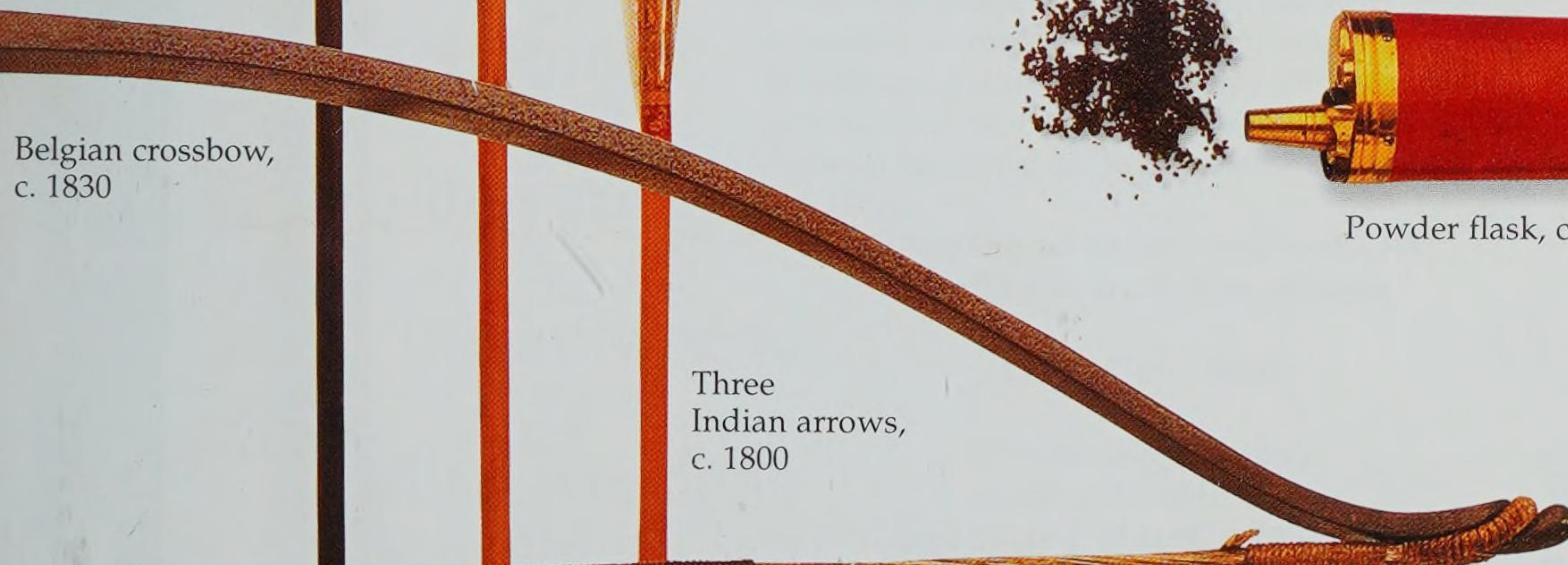
Howdah pistol,  
c. 1850



Powder flask, c. 1850



Three  
Indian arrows,  
c. 1800



Belgian crossbow,  
c. 1830



German war hammer, c. 1600



A Dorling Kindersley Book



Niam Niam, a ceremonial  
knife from Sudan



Copper dagger of the  
Kasai people in  
West Africa



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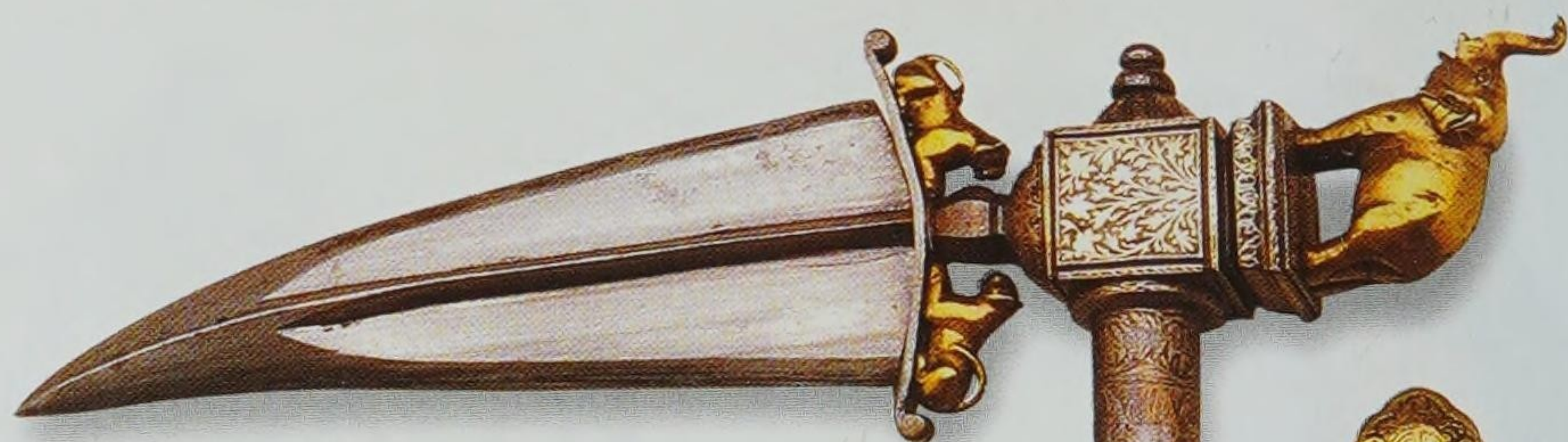
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Maratha "crow-bill" war  
pick from northern India



Chinese sword in  
wooden sheath,  
clad in tortoiseshell  
with brass mounts



# Contents



Spiked iron  
bracelet  
from eastern  
Sudan



Buffalo horn  
knuckleduster  
from southern India

6	Prehistoric weapons
8	Missile weapons
10	The first warriors
12	Greeks and Romans
14	Weapons from Barbarian Europe
16	European swords
18	Crossbow and longbow
22	Axes, daggers, and knives
24	Mail and plate armour
26	A suit of armour
28	Helmets
30	Tilting armour
32	An Indian warrior
34	Indian weapons
36	A Japanese samurai
38	Early firearms
40	Flintlock firearms

42	Duelling swords
46	Duelling pistols
48	Attack by highwaymen
50	Bizarre handweapons
52	Grenadiers and cavalry
54	Keeping law and order
56	The percussion revolver
58	Pistols
60	Guns that won the West
62	North American Indians
64	Did you know?
66	Who's who?
68	Find out more
70	Glossary
72	Index

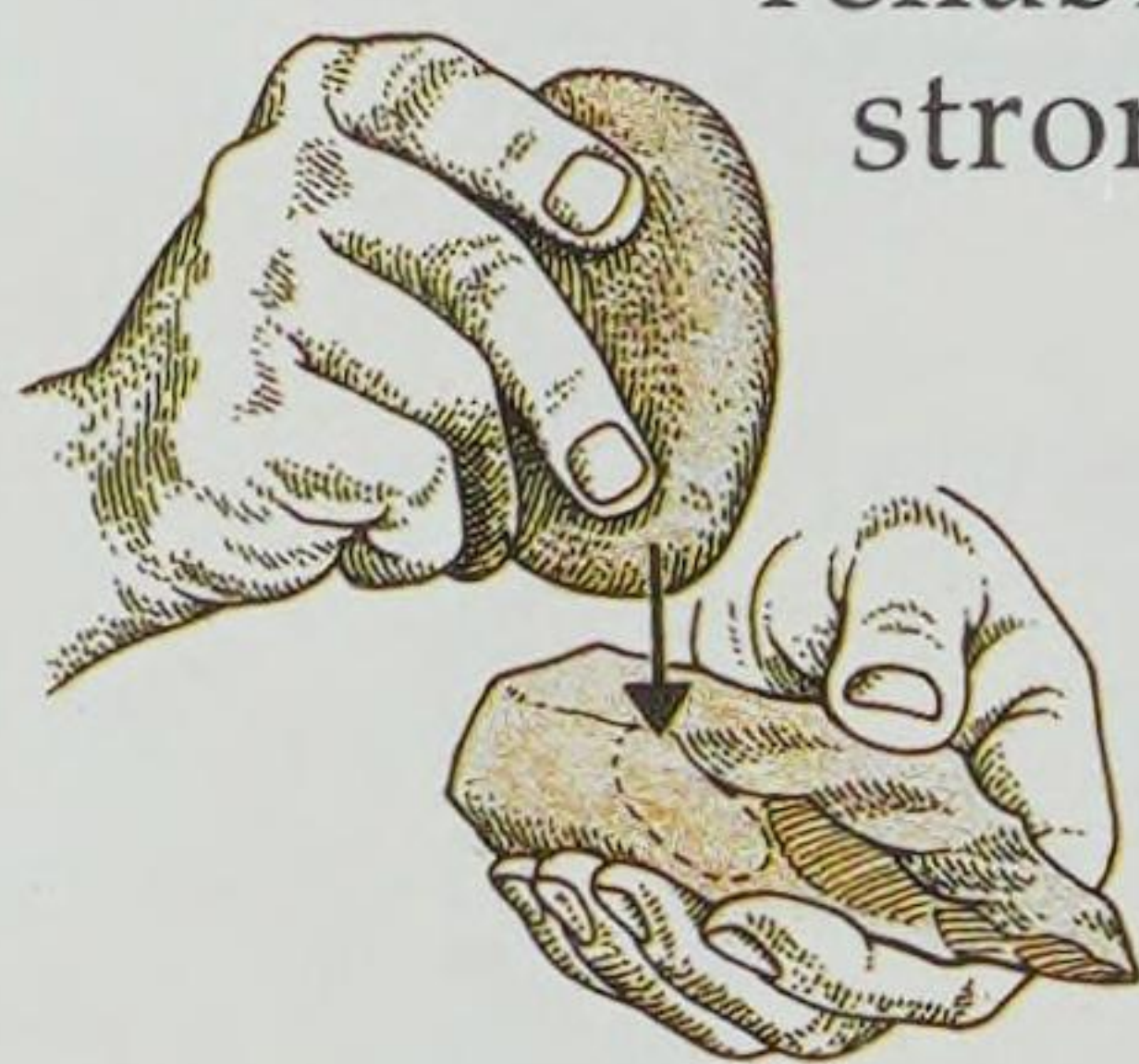


# Prehistoric weapons



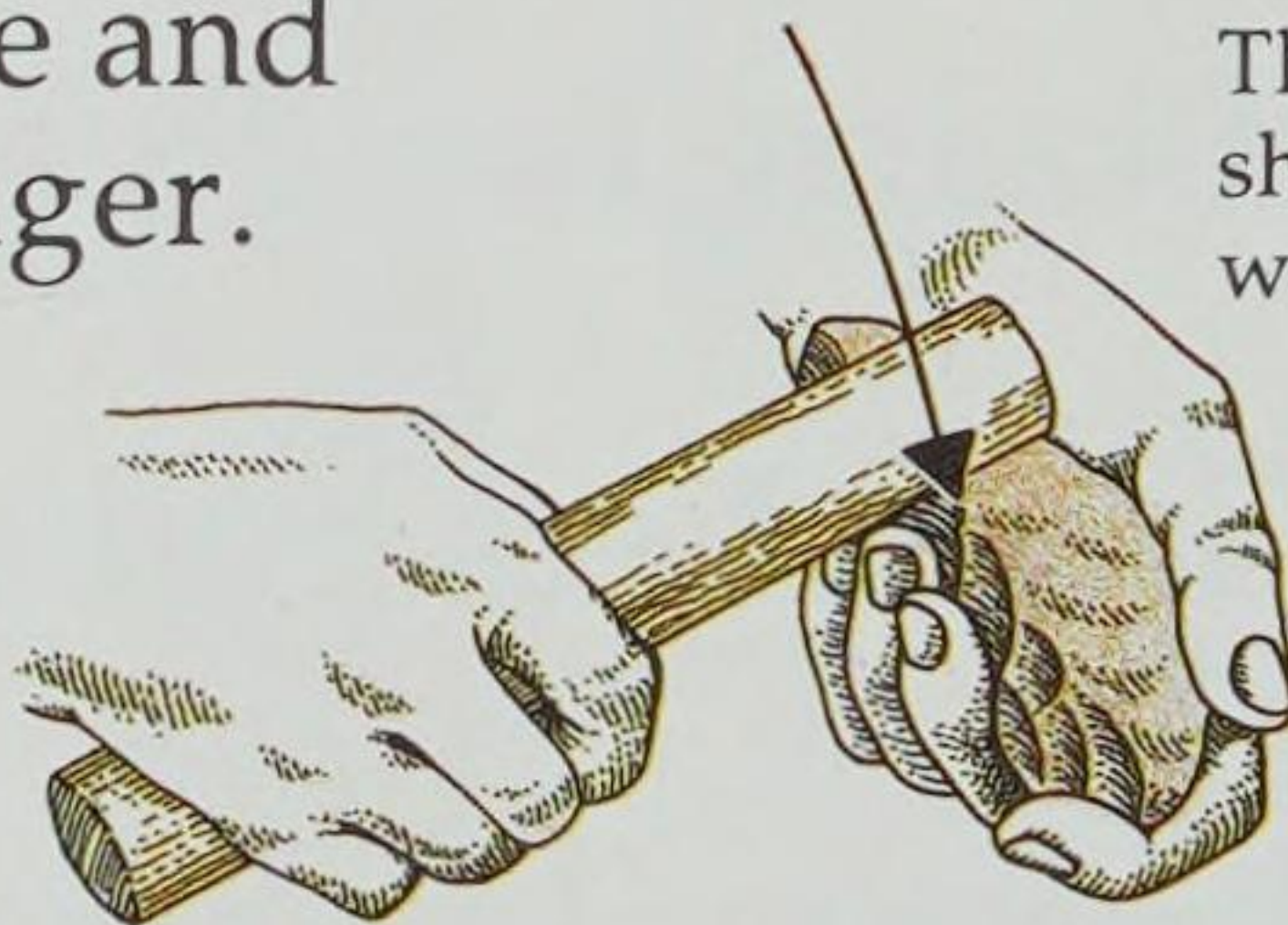
IN ORDER TO HUNT, attack others, or defend themselves, people have always used weapons. In the Early Palaeolithic or Old Stone Age, the tiny, scattered communities used weapons mainly for hunting. Early people discovered that if they chipped hard stones such as flint into a pointed shape they could be used for killing and skinning animals.

Thousands of years later, in the Upper Palaeolithic or Later Stone Age, weapons were revolutionized by the invention of the handle or haft. By lashing a handle onto an axehead, or spearhead, prehistoric man found that his hunting and attacking weapons became both more reliable and stronger.



## BREAKING OFF A FLINT FLAKE

The first stage of preparing a flint tool or weapon was to break off a large flint flake with a hammer-stone.



## STRIKING OFF CHIPS

After the hammer-stone had made a rough shape, the remaining core was fashioned into a tool or weapon with a wooden or bone hammer.

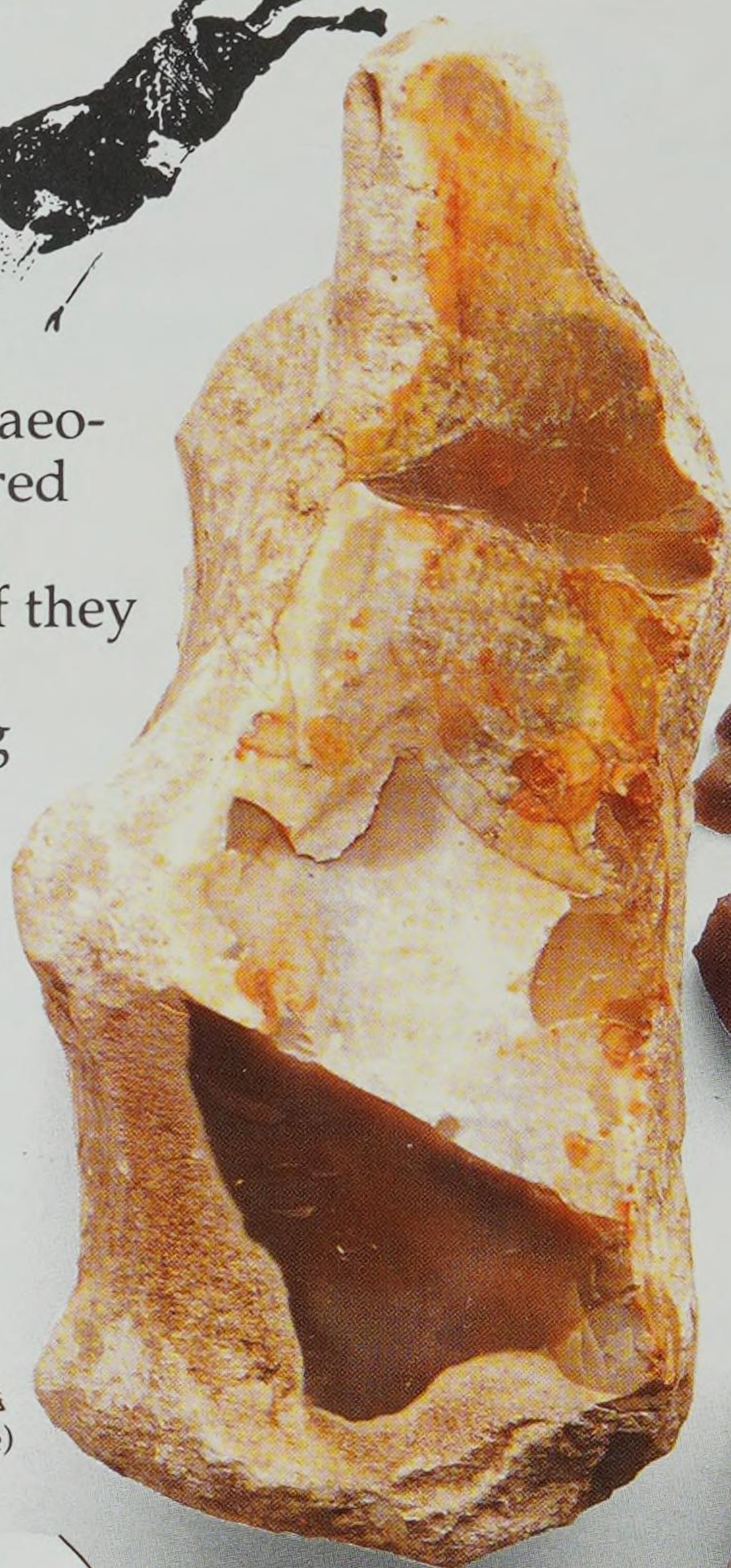


## PRESSURE FLAKING

A more refined method of working a weapon or tool to a desired shape was by using a bone, stone or wooden implement to pare the flint's surface.



The illustration (above) shows how hand-axes were probably held



Flint flakes



**FLINT NODULE** above  
The first tools and weapons would have come from a lump of flint rock like this. In order to fashion a hand-axe, stone flakes were broken off with another stone.



**TWO PALAEOLITHIC HAND-AXES,**  
c. 300,000 - 200,000 B.C.  
These axes or chopping tools, made by an ancestor of modern man, are hardly recognizable as tools or weapons.

**CRUDE PALAEOLITHIC HAND-AXE,**  
250,000-70,000 B.C. *right*  
Although made during the same period in pre-history as the axe above right, this weapon or tool shows far less workmanship.



Held at wide end



**DEER HUNTING**  
An old engraving shows a New Stone Age hunter killing a deer with a flint axe, fastened to a wooden handle.



**TWO SHAPED PALAEOLITHIC HAND-AXES,**  
c. 250,000-70,000 B.C. *left and below*  
Hand-axes were certainly used by  
Palaeolithic people as weapons  
when hunting animals, but it is  
purely conjecture whether an axe  
like this was ever used as a  
battle-axe in warfare.

Rough  
cutting edge —

**MIDDLE PALAEOLITHIC  
HAND-AXES,**  
c. 80,000-40,000 B.C. *right*  
Of a similar date, these  
two hand-axes were  
made by a type of early  
people known as  
Neanderthal man.



A cave painting of bowmen,  
painted between 12,000 and 3,000  
B.C., found at Cueva Remigia,  
Spain (above)

#### A STONE AGE MAMMOTH HUNT

Hunters in the Old Stone Age needed both bravery  
and guile to trap and kill large animals. Having  
been driven into a pit, this woolly mammoth, an  
extinct type of elephant, is being battered to  
death with rocks. The spears sticking into the  
mammoth's sides would have been  
made of sharpened wood.



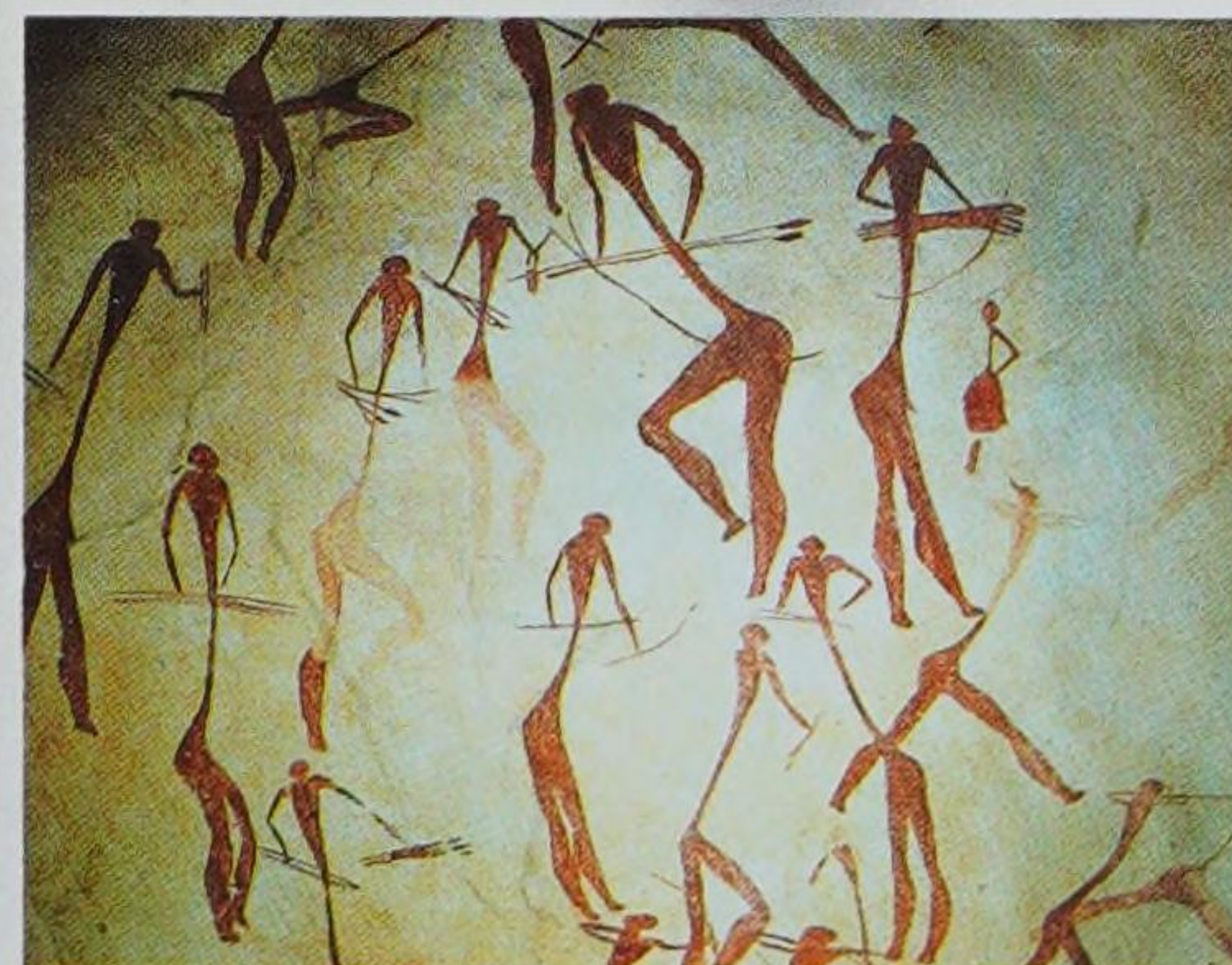
Spearhead tip —

**SPEARHEAD, c. 20,000 B.C.**  
By the time this possible  
spearhead was made by  
*homo sapiens sapiens* or  
modern man, handles  
had been invented, thus  
revolutionizing weapons  
and tools.



#### STONE AGE HUNTERS

Cave paintings  
found in European  
countries such as  
Spain and France  
either show hunters  
or the animals  
they killed.





# Missile weapons

ANYONE WHO HAS EVER thrown a stick or a stone, fired a catapult, or shot an arrow from a bow has used a missile weapon. Indeed, such weapons have been used for both hunting and fighting since prehistoric times. More unusual missile weapons include the boomerang, traditional weapon of the Australian Aborigine, and the curiously shaped throwing weapons used by the tribespeople of Central and West Africa. The simplicity of these weapons is deceptive for when used by skilled throwers they are just as effective as more complex hand weapons.



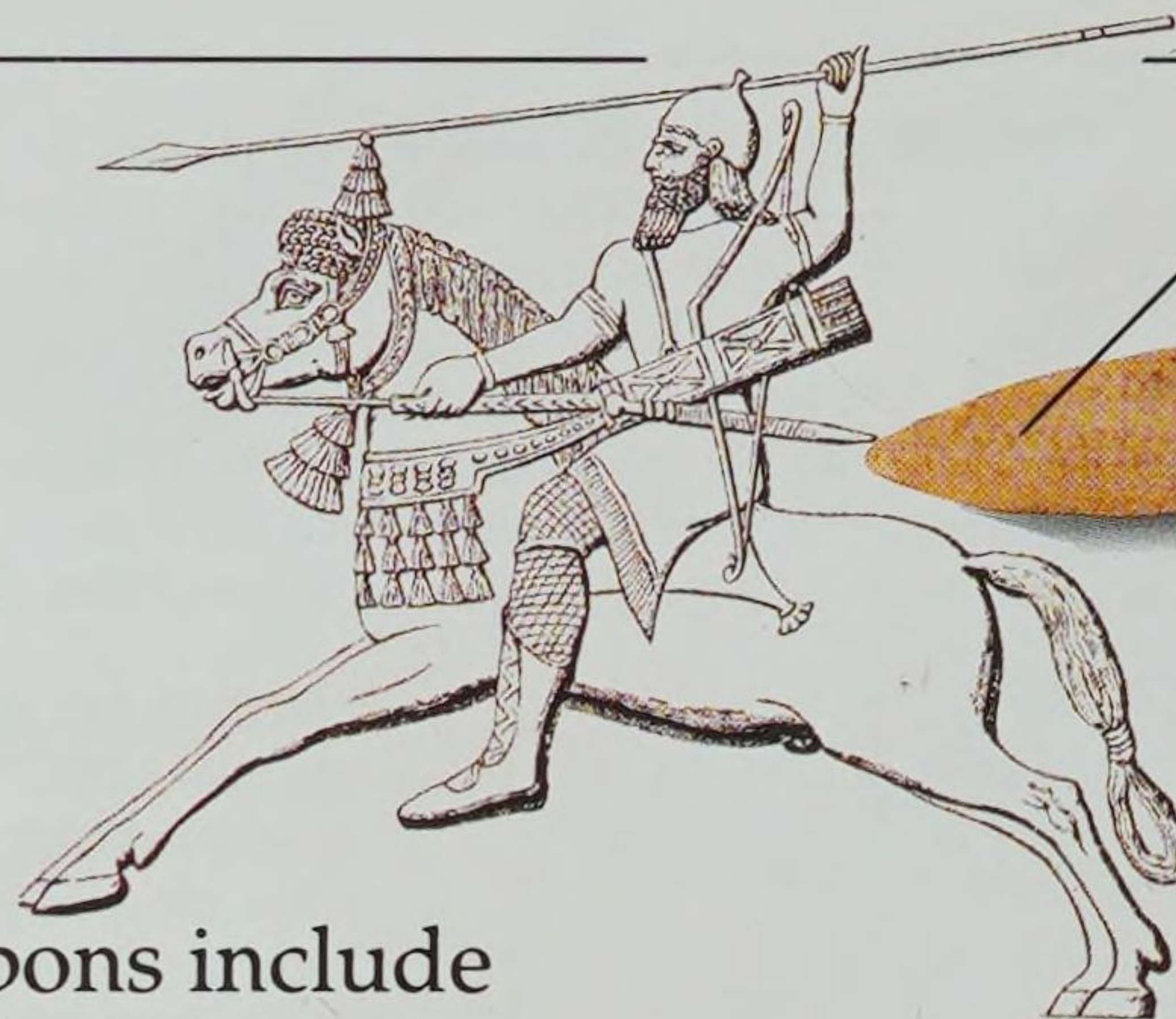
## THROWING A BOOMERANG

When used by a skilled thrower, such as this Australian Aborigine, a boomerang can be sent great distances.

**PARRYING STICK** *above*  
Sticks are defensive rather than offensive weapons. This Aborigine parrying stick deflects missile weapons such as spears and boomerangs.

**THROWING CLUB** *above right*  
An Aborigine aiming this wooden throwing club would have aimed to stun his victim with the weapon's pointed end. Some of the wooden war clubs used by Pacific Islanders and African tribesmen are also used as missile weapons.

**ABORIGINES HUNTING**  
Australian Aborigines are peaceful people who rarely use their weapons for fighting. In this 19th-century painting a group of Aborigines are hunting game with hand clubs, shields and multi-tipped fishing spears.



Stone arrowhead

**ASSYRIAN HORSEMAN**  
In this Assyrian relief a horseman carries a lance, a sword, and a bow with arrows.

**FIGHTING BOOMERANG** *left*  
The large wooden boomerangs used by Aborigines in war are designed to fly straight and do not return to their throwers even if they miss their targets.

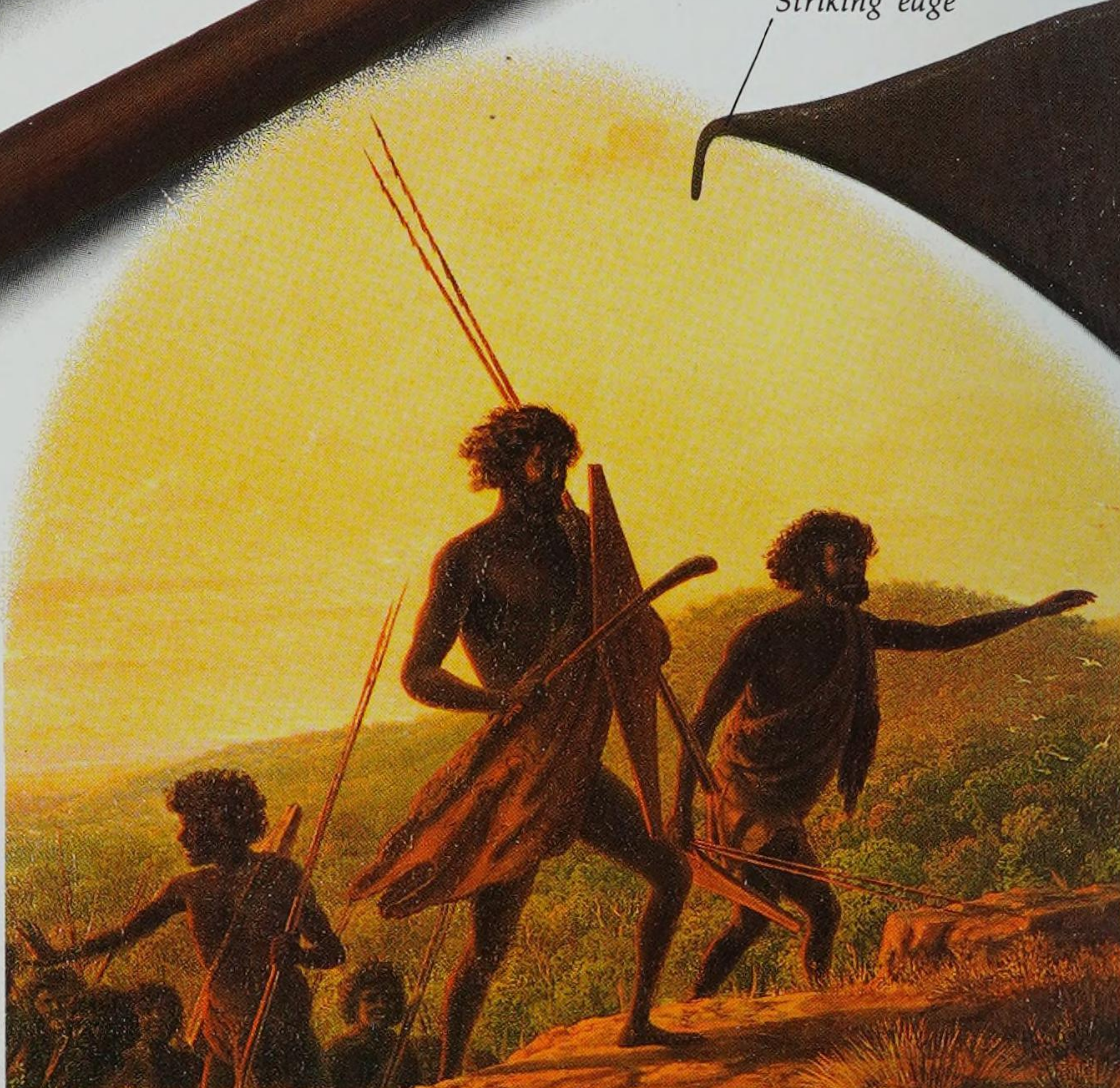
Flat piece of hard wood

Grip

Flatter on one side than the other

Striking edge

Club's pointed end





**ABORIGINE SPEAR** *above*  
Made of stone or bone, the heads of Aborigine throwing-spears are made in much the same way as spears used by Stone Age hunters (p. 7).

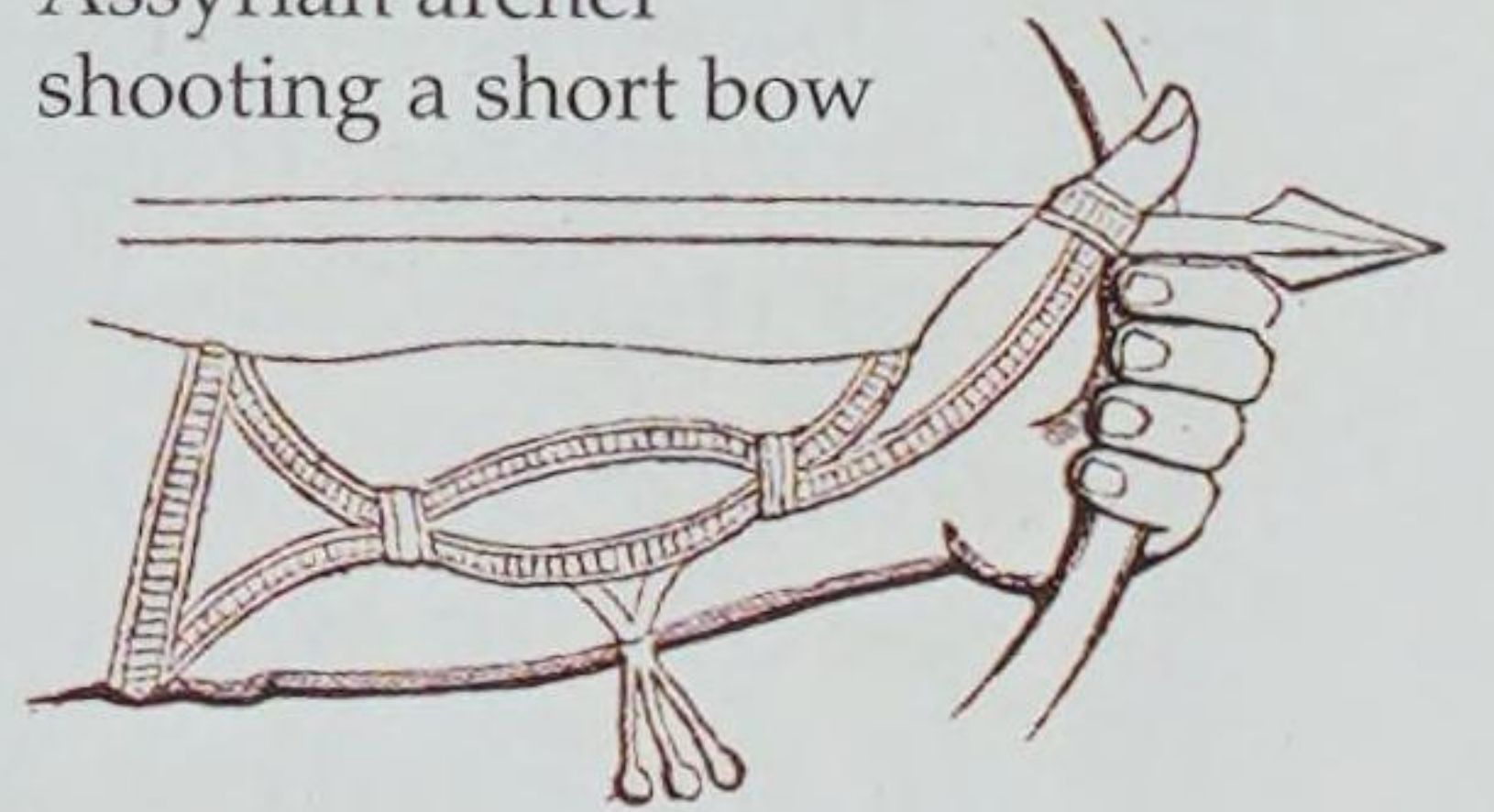
Protective  
arrow sheath

Poisoned tip

#### SHORT BOW

Although bows are popular all over the world only a few tribespeople make poisoned arrows. This bow and poisoned arrow come from West Africa.

Assyrian archer  
shooting a short bow



Persian king using a  
bow and arrow



Striking edge

#### THROWING AXES

Although steel throwing axes were only popular in Europe during the Middle Ages, they have always been used by certain African tribes. Both these throwing axes were made in West Africa, c. 1900.

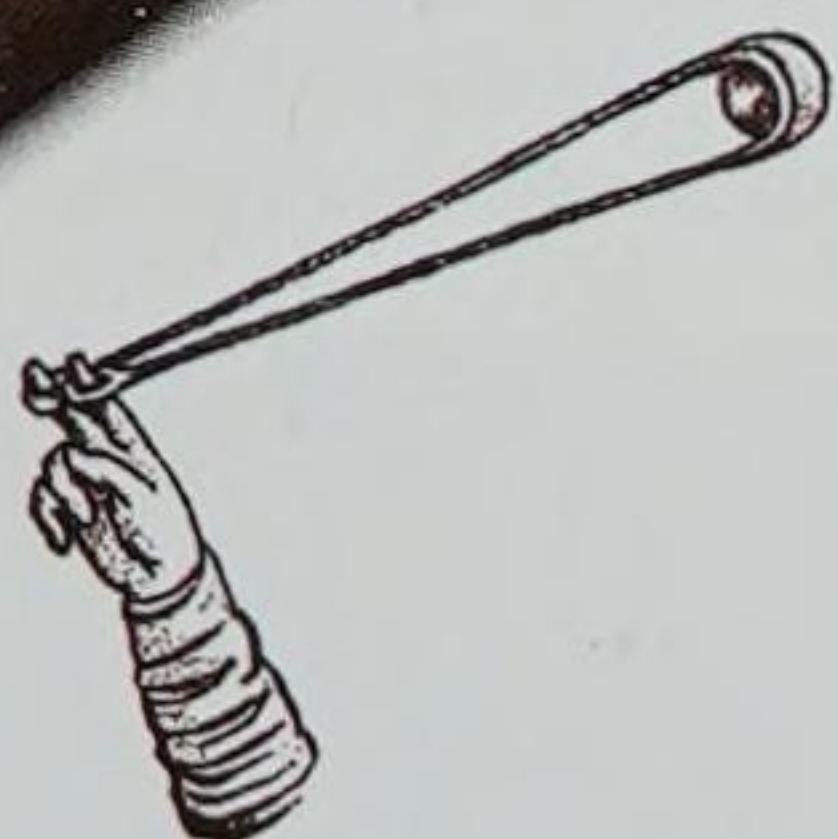
#### THROWING KNIFE

Among the most unusual-looking weapons are African throwing knives. A multi-bladed weapon always has a better than average chance of striking its target.

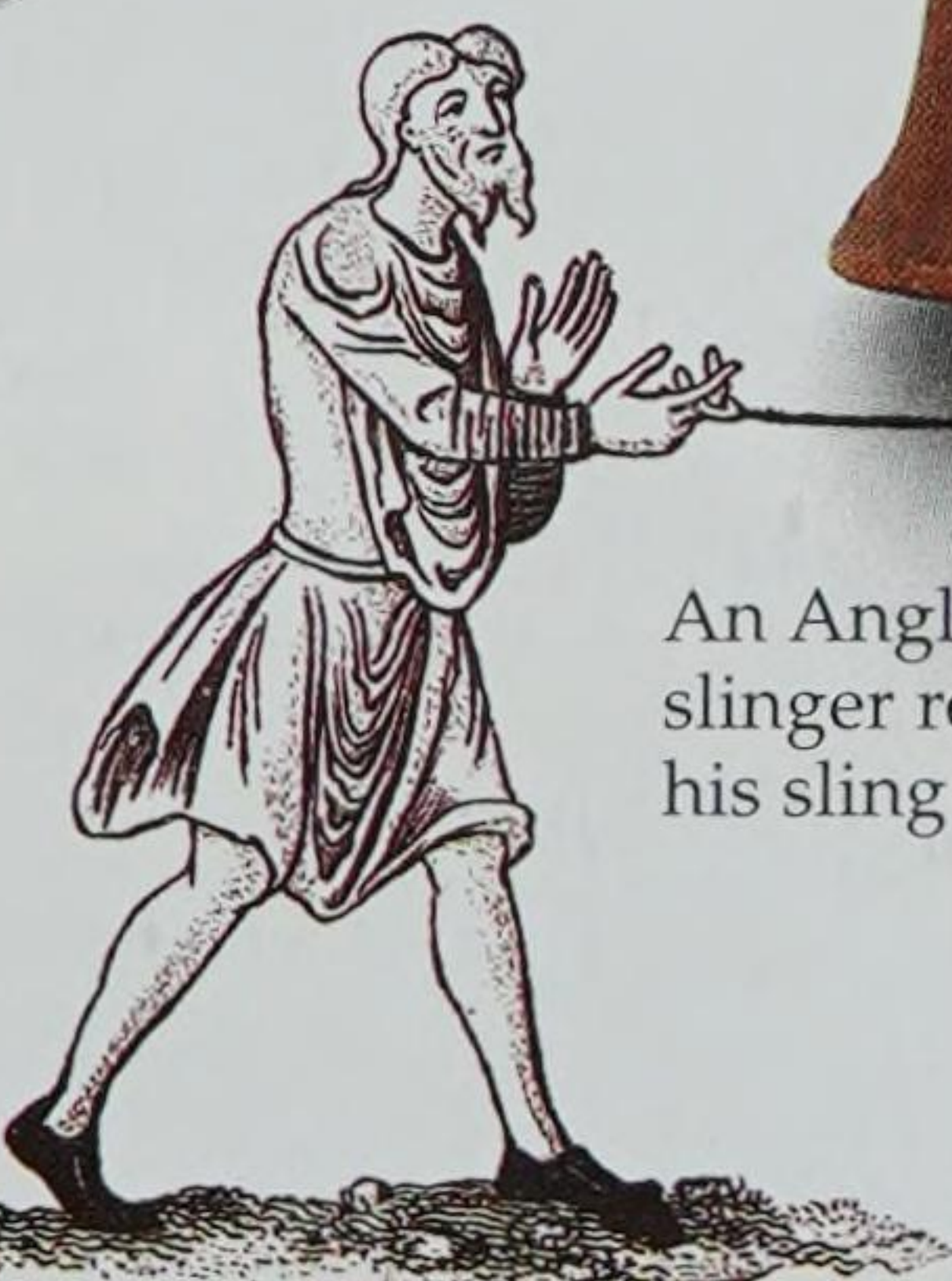
Short handle

#### THE STAFF SLING

*below*  
Slings were used by European armies until the 16th century when they were used to hurl grenades. The staff sling, a shaft with a leather sling fixed to one end, could hurl stones with tremendous force.



Holding a sling (above)



An Anglo-Saxon  
slinger releasing  
his sling (left)







# The first warriors

THE DISCOVERY OF METALS such as copper, bronze, and iron, revolutionized the making of tools and weapons, as each was progressively harder and stronger. Bronze, made by mixing metals, was first used in south-west Europe about six thousand years ago. In the early part of the Bronze Age, axes and spears were still tanged (bound to a handle or haft by leather strips or string) but by the end of the Bronze Age, weapons were more firmly secured to handles by sockets. In the 6th and 7th century B.C., Celtic tribesmen began to make iron as well as bronze tools and weapons, and their richly ornamental culture is well-illustrated by these finely crafted artefacts.

**HALBERD BLADE,**  
c. 2300-1600 B.C. *below*  
Made either in Ireland or on the European mainland, this copper halberd could be used either for cutting or chopping, thus combining the uses of a battle-axe and spear.

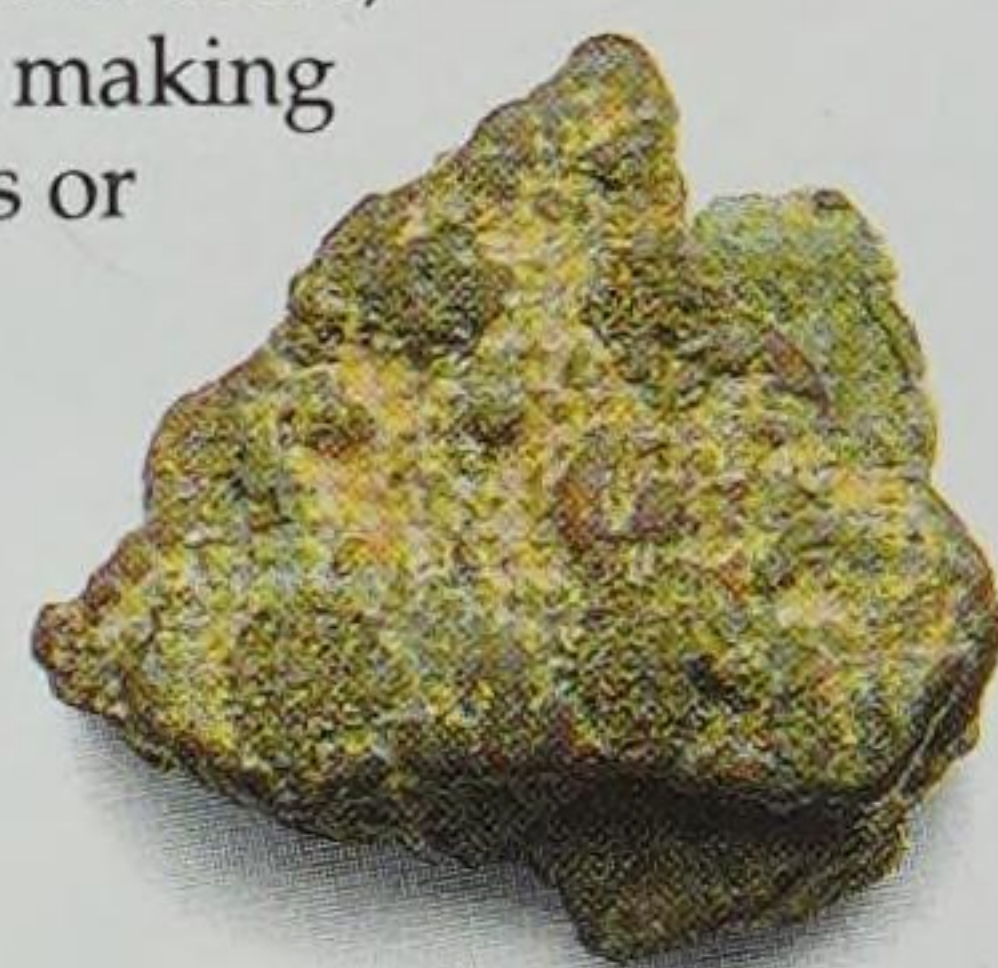
**FLINT ARROWHEADS,**  
c. 2700-1800 B.C. *above*  
Bows and arrows were used for the first time during the Mesolithic Age (Middle Stone Age). About 2 500 B.C. these "barbed and tanged" arrowheads were used for hunting or warfare.

Celtic warrior,  
c. 450 B.C., carrying a  
sword and spear



**BRONZE SPEARHEAD,**  
c. 900-800 B.C. *above*  
Crude spears were first used in the New Stone Age (pp. 6-7). By the Bronze Age, spearheads like this were made by skilled bronze-smiths.

A fragmentary ingot of  
copper or bronze,  
used for making  
weapons or  
tools



Socket for  
insertion of  
handle



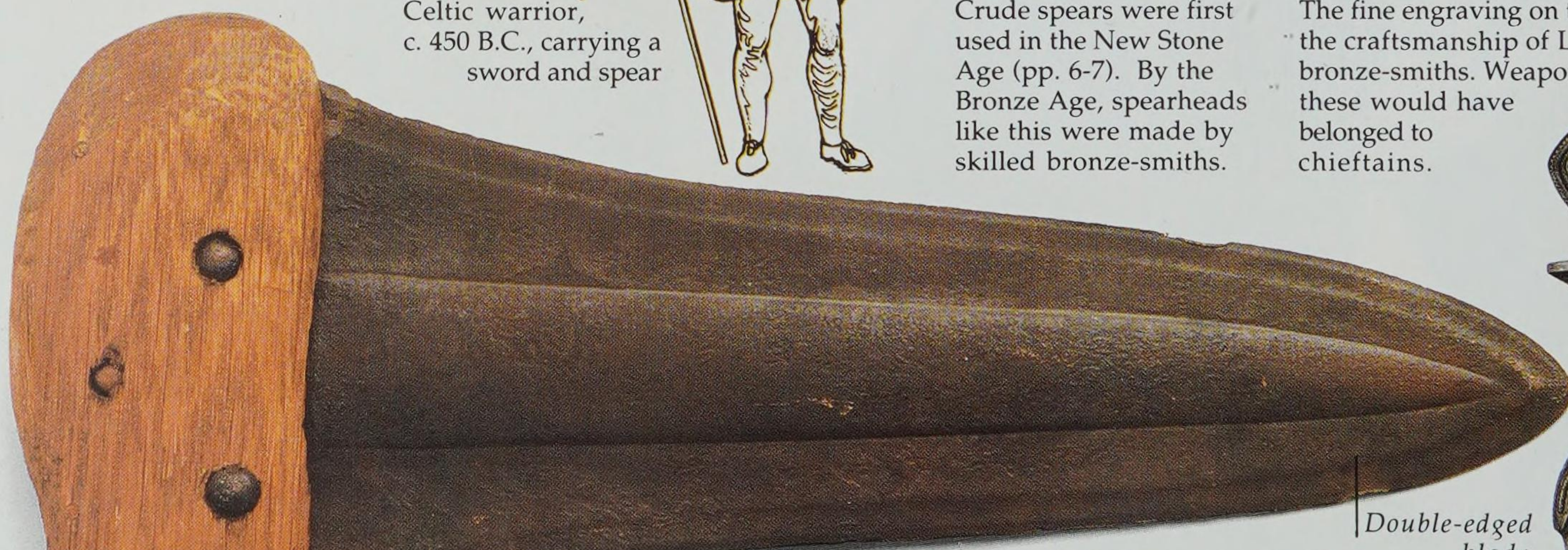
Loop through which a  
cord tied axehead to haft



**THREE BRONZE AXEHEADS,**  
c. 750-650 B.C.

By the Late European Bronze Age, bronze-smiths had learned to make socketed axes into which wooden hafts were inserted. Axes were used for warfare or woodworking.

**BRONZE SWORD POMMELS AND HILTS**  
The fine engraving on these swords show the craftsmanship of Late Bronze Age bronze-smiths. Weapons such as these would have belonged to chieftains.

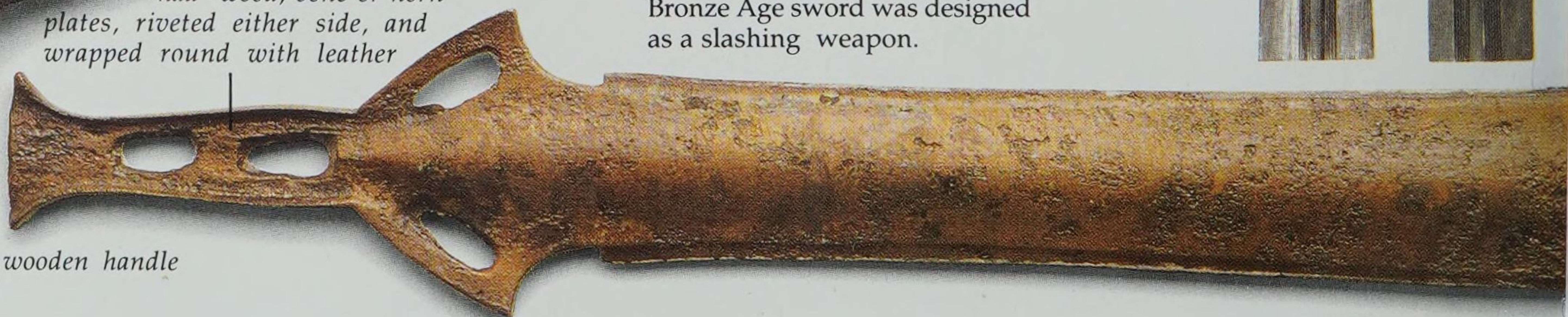


Double-edged  
blade

**BRONZE AGE SWORD,** c. 900-800 B.C.  
This gracefully shaped, Late Bronze Age sword was designed as a slashing weapon.

Grip would have  
had wood, bone or horn  
plates, riveted either side, and  
wrapped round with leather

Long wooden handle







**BRONZE AGE HELMET,**  
c. 15th CENTURY B.C.

Found in East Germany, this Bronze Age warrior's helmet would originally have had protective ear-pieces.



19th-century engraving of a Celtic chieftain carrying a heavy spear



**BRONZE HELMET,**  
c. 1st CENTURY A.D.

This horned Iron Age warrior's helmet was found in the River Thames in London. It was almost certainly a parade helmet, not being strong enough to wear in battle.



**IRON AGE SHIELD,**  
c. 200-100 B.C. *left*

Recovered from the River Thames, this beautifully decorated shield was probably for ceremonial use rather than warfare. The bronze sheet originally had a wood backing, and the shield's inserts are coloured glass studs.

**"VERCINGETORIX**  
**BEFORE CAESAR" *right***

The leader of the Gauls in their revolt against Roman rule, Vercingetorix was captured by Julius Caesar in 52 B.C. In this painting, the Celtic weapons on the ground include a shield, helmet and sword.



**IRON AGE DAGGER IN**  
**SHEATH, c. 550 B.C.**

This early British iron dagger would have belonged to a tribal chief. The bronze sheath would have hung from his belt by iron loops.

*Guard*

*Wood lining wrapped around with bronze strips*

*Dagger tip*

**EARLY BRONZE**  
**AGE DAGGERS**

Central European tribesmen used these daggers for fighting at close quarters.



*Double-edged blade*





# Greeks and Romans

THE TWO GREATEST ARMIES of ancient times were the Macedonian army under Alexander the Great and the Roman army. From 334 to 326 B.C., Macedonia, a small Greek state, had a superb army built around the phalanx – solid lines of spear-carrying infantry. The basis of the Roman army was the legion – units of infantry with supporting cavalry. Between 800 B.C. and A.D. 200 it was the Roman army's continuing responses to enemy weapons and to the changes in available materials, coupled with good discipline and an efficient organizational ability, which brought Rome to its pre-eminent position as ruler of the ancient world. The

Roman armour and weapons shown on these pages are accurate replicas of equipment carried by the legions.

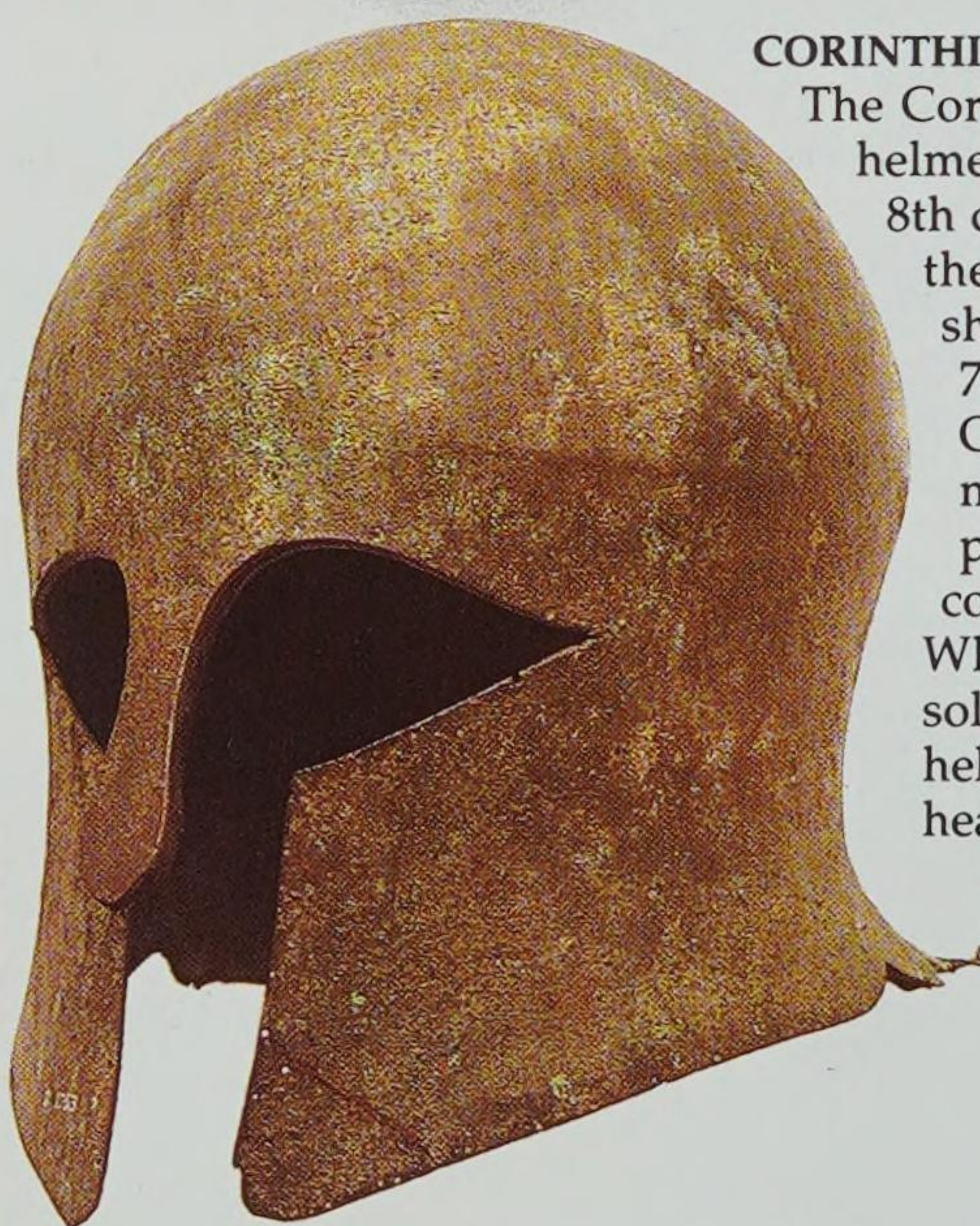
A Roman standard bearer wearing a *gladius*

## A Greek hoplite

A Greek foot soldier or hoplite's armour included a metal helmet, a breastplate made of bronze or layers of linen reinforced by scales or plates, a metal shield, and leg armour.



**GREEK VASE**  
Much of our knowledge of ancient Greek arms and armour comes from decorations on contemporary vases. Here, the Greek hero Achilles is shown killing Penthesilea. Painted about 540 B.C., the two figures depicted give a good idea of the helmet styles and body armour of the period.



**CORINTHIAN HELMET**  
The Corinthian-type Greek helmet, first made in the 8th century B.C., reached the elegant shape shown here in the 7th century B.C. Only the eyes and mouth were uncovered, providing almost complete protection. When not fighting the soldier often wore his helmet on top of his head for comfort.

**SCENE FROM THE ILIAD**  
A Victorian depiction of soliders from the Greek epic poem the *Iliad*. Written in the 8th century B.C. and attributed to Homer, the poem tells of the events in the final year of the mythological Trojan War. The warrior on the left is wearing his sword on his right hip, Roman style.

Gladius handle made of wood or bone

**MILITARY DAGGER**  
Soldiers carried a short dagger called a *pugio* on the belt at their left hip. Its iron scabbard was often decorated with inlaid enamel patterns. Roman works of art only depict soldiers wearing a *pugio* in the 1st centuries B.C. to A.D., which suggests that it was not considered an essential weapon.

Grip made of bronze

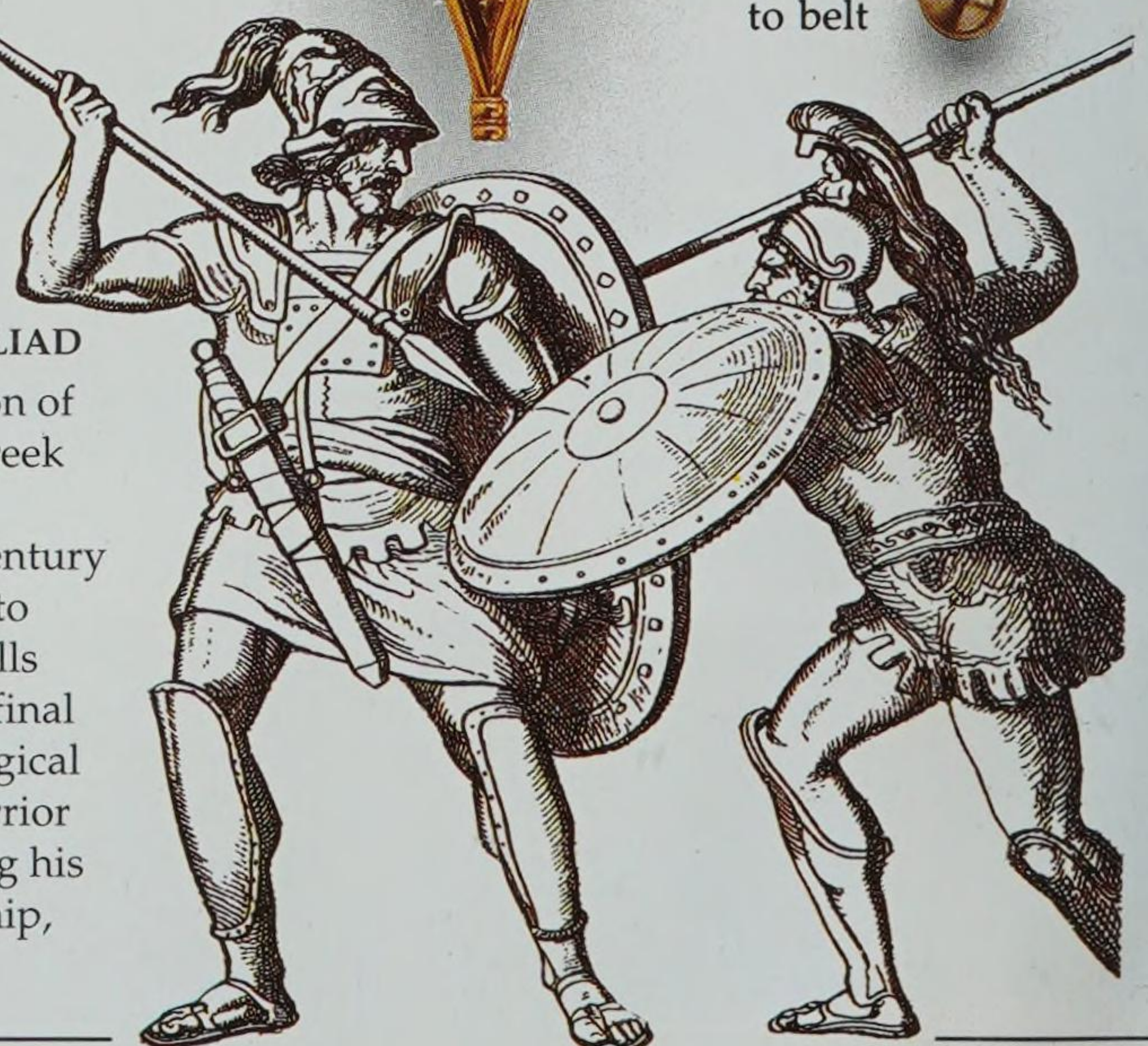
Double-edged blade

Scabbard made of wood covered in leather and decorated in bronze

Iron scabbard with loops for attachment to belt



**INFANTRY SWORD**  
The *gladius* was a short, double-edged sword which was used more for thrusting than for cutting. It was worn, except for the officers, at the right hip either on a belt or a baldric (shoulder belt). The scabbard was sometimes highly decorated, as in this example from the 1st century A.D.





Long iron point

Horse hair crest

Holder for horsehair crest

#### IRON HELMET

The iron Imperial Gallic helmet (c. A.D. 50 to 150) had a deep neck guard, a brow guard to deflect sword strokes, and cheekpieces of doubtful value.

#### BRONZE HELMET

The bronze Montifortino helmet (c.50 B.C.) is a very simple design which carried a horsehair crest. Later helmets of this type had feathered crests.

Broad cheekpieces hinged to side of helmet and tied under chin with straps or cords

#### THROWING SPEARS left

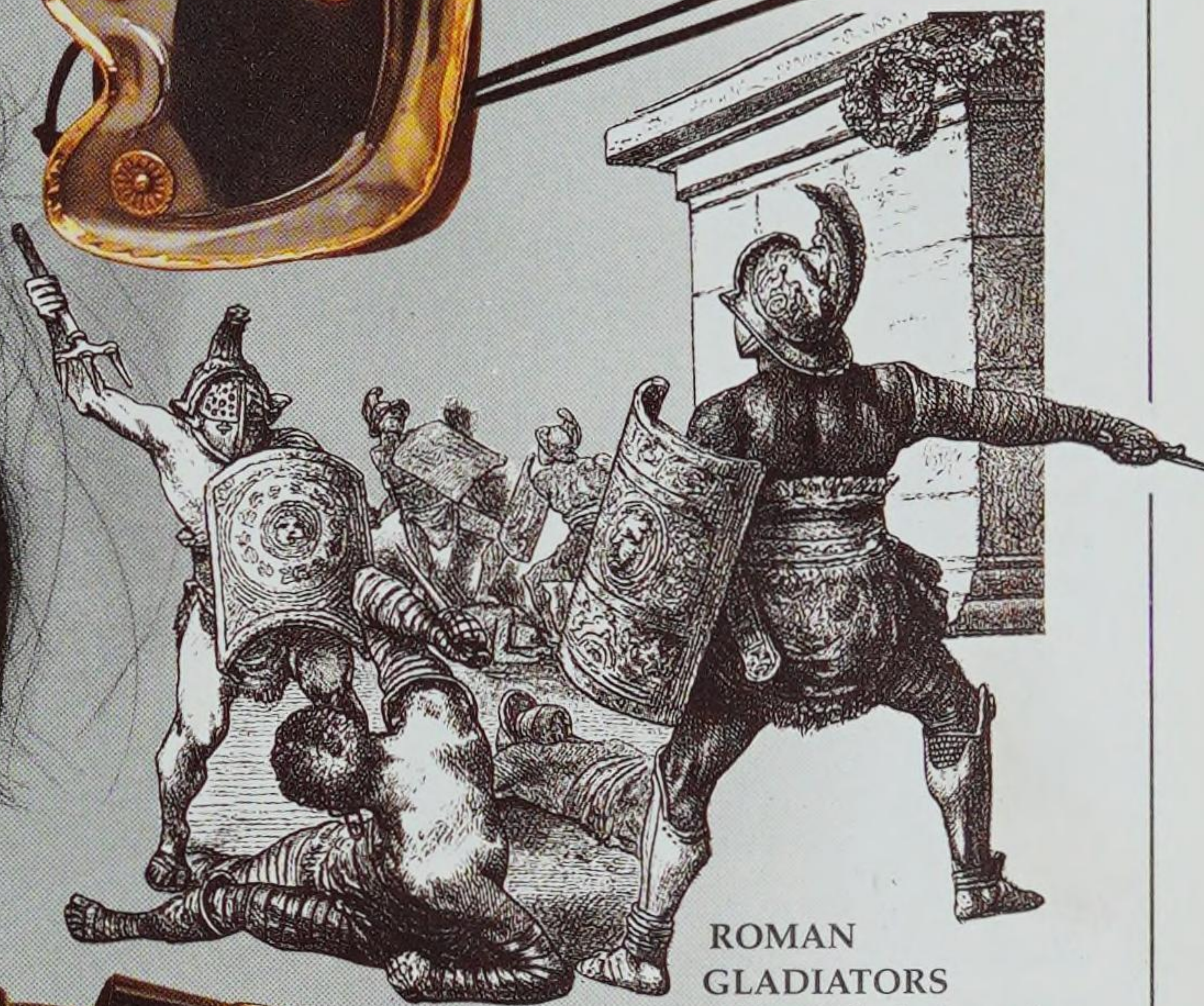
The head of the *hasta* (right) is a familiar shape for a spear, but the long head of the *pilum* (left) was designed to pierce a shield and then continue on into the soldier behind it.

Armour laced together at the front and upper part of armour hooked to lower part by bronze hooks

#### BODY ARMOUR

Made of iron strips, the *lorica segmentata*, an early cuirass (p. 26), was worn from early in the 1st century A.D. until the 3rd century. It partially replaced the earlier chain mail and scale armour. The strips were held together by leather straps on the inside and the armour had many bronze fittings.

Long haft made of ash



#### ROMAN GLADIATORS

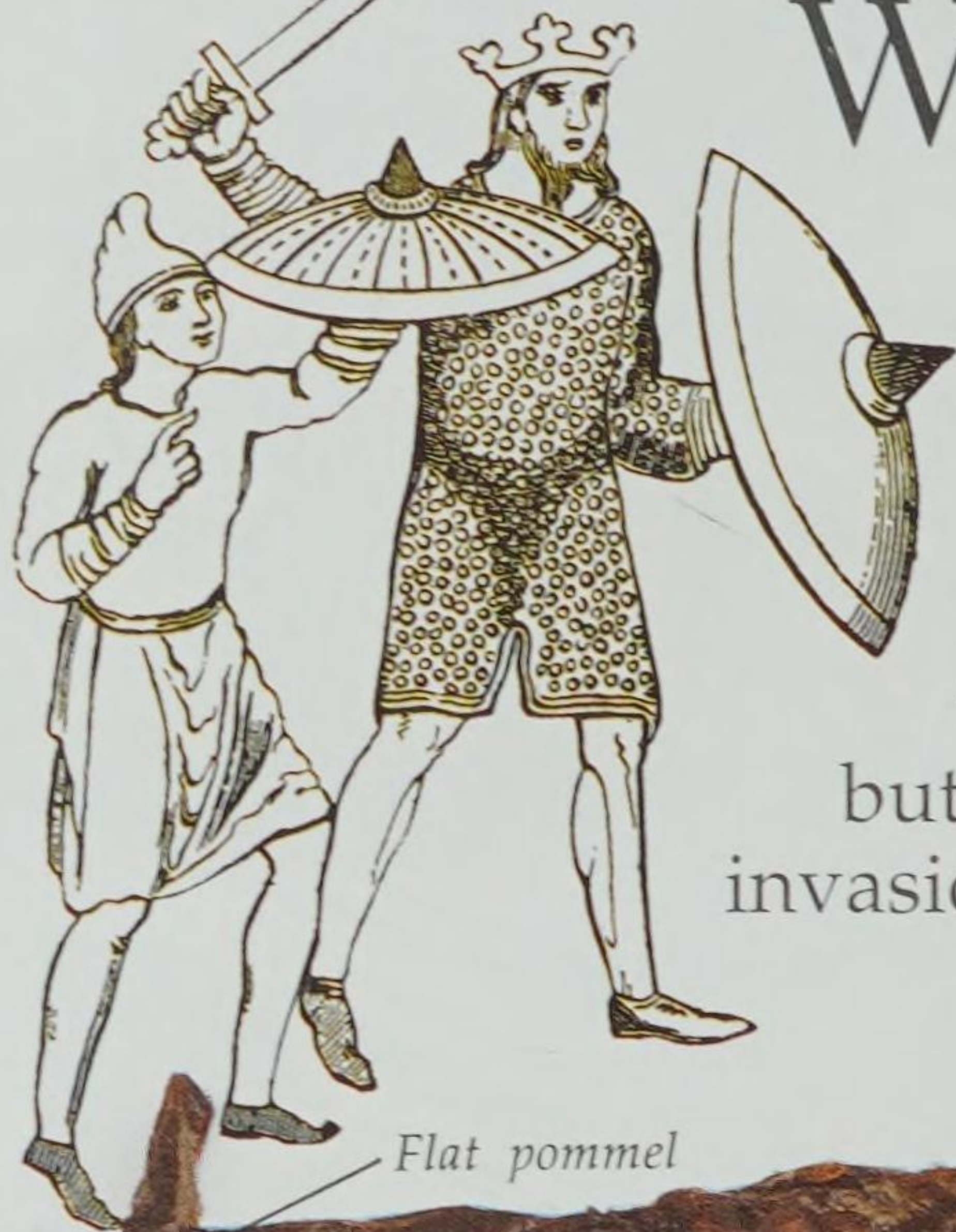
Although their style was more flamboyant than that of the Roman army, gladiators had similar weapons and armour, such as swords and rectangular shields.

Victorian depiction of Roman legionaries





# Weapons from Barbarian Europe



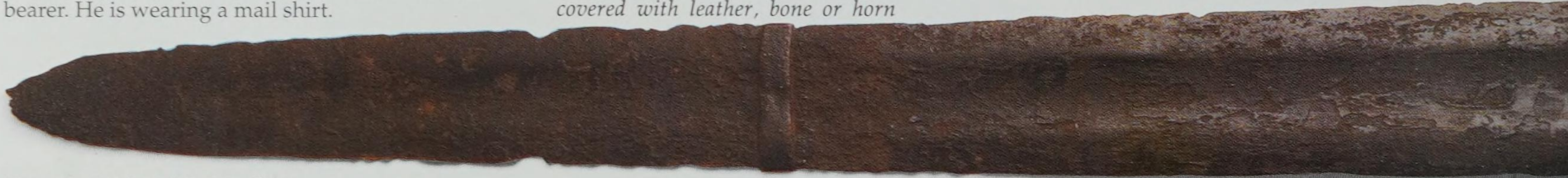
THE PERIOD IN EUROPEAN HISTORY BETWEEN the 400s and 900s is sometimes called the Dark Ages, when Germanic and Scandinavian tribesmen (Anglo-Saxons and Norsemen or Vikings) raided and settled in the Low Countries, England, France, and Spain. Our knowledge of this period comes not only from surviving weapons and equipment, but from textiles such as the Bayeux tapestry, which celebrated the invasion of England by the Normans (Norsemen) of north-west France.

Flat pommel

ANGLO-SAXON SWORD, c. 500-600 *above*

Swords were only used by Saxons of high rank, such as the king (*above*), shown with his shield bearer. He is wearing a mail shirt.

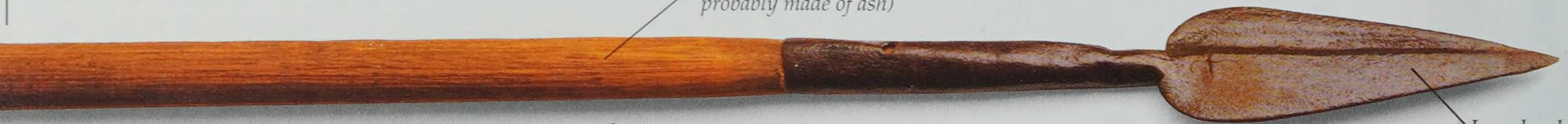
*Missing grip would have been made of wood, and possibly covered with leather, bone or horn*



VIKING SWORD BLADE *above*

Made by skilled craftsmen, Viking sword blades were double edged with slightly blunted tips.

*Reproduction shaft (original probably made of ash)*



Iron head

SHORT SPEAR, c. 400-500 *above*

Short-headed Saxon spears were used both for stabbing and throwing.



LONG-HEADED SPEAR, c. 400-500 *above*

This Saxon stabbing spear had a long, leaf-shaped head.

VIKING GOD

As Tyr, a god of war, was believed to give victory in battle, Viking swords were often marked with the letter T.



ANGLO-SAXON HELMET, c. 600

This helmet was recovered from an Anglo-Saxon burial ground.







### THE NORMANS ATTACK THE ENGLISH

A valuable document on the weapons of the Norman period, the Bayeux tapestry is a strip of embroidered linen that chronicles the Norman invasion of England in 1066.



Inlaid pattern

### SWORD GUARD, c. 1040

Made of metal, ivory, bone or horn, sword guards were often inlaid with precious metals.

Rounded point



Pyramid-shaped pommel

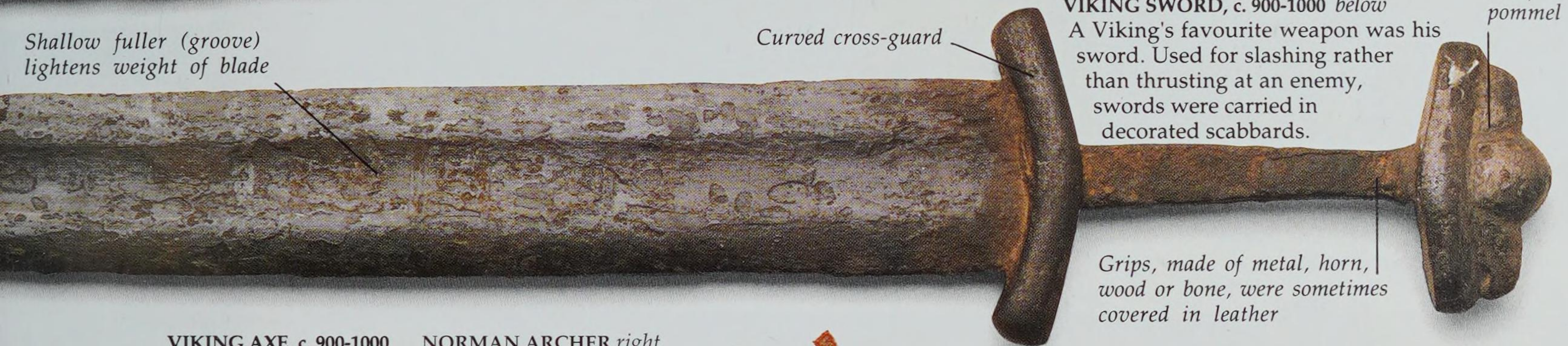
Shallow fuller (groove) lightens weight of blade

Curved cross-guard

### VIKING SWORD, c. 900-1000 below

A Viking's favourite weapon was his sword. Used for slashing rather than thrusting at an enemy, swords were carried in decorated scabbards.

Grips, made of metal, horn, wood or bone, were sometimes covered in leather



### VIKING AXE, c. 900-1000

A Viking warrior swung his battle-axe around his head in an arc before landing an almost certainly fatal blow on an enemy or his horse.

### NORMAN ARCHER right

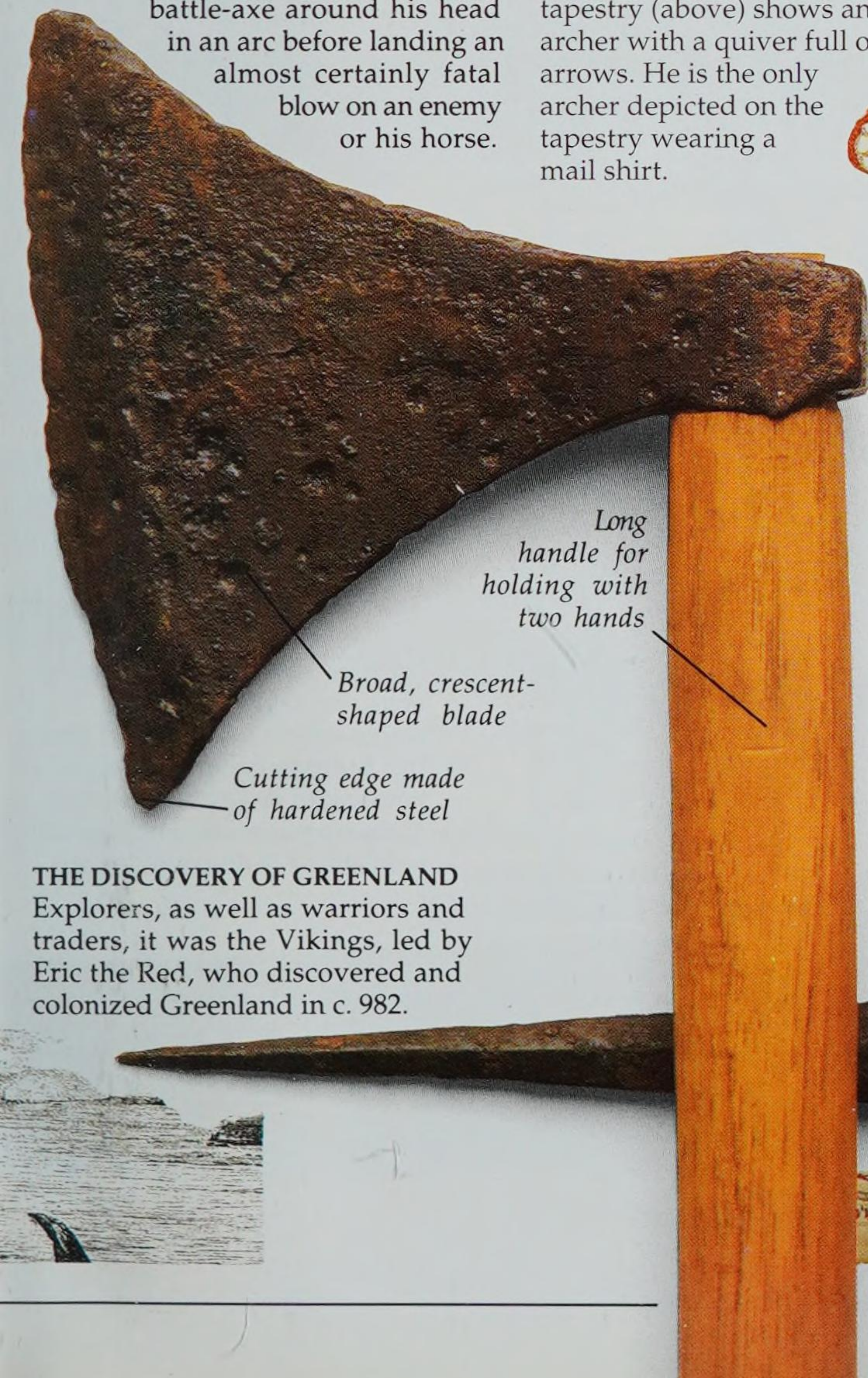
This detail from the Bayeux tapestry (above) shows an archer with a quiver full of arrows. He is the only archer depicted on the tapestry wearing a mail shirt.



Norman knights using spurs and stirrups

### NORMAN SPUR, c. 11th CENTURY

First used in ancient Greece and Rome, spurs helped the Norman knight, a skilful horseman, to control his horse in battle.



Long handle for holding with two hands

Broad, crescent-shaped blade

Cutting edge made of hardened steel

**THE DISCOVERY OF GREENLAND**  
Explorers, as well as warriors and traders, it was the Vikings, led by Eric the Red, who discovered and colonized Greenland in c. 982.

Arrowhead made of iron

Three Norman arrows (above and below)



Sharply-pointed Norman lance

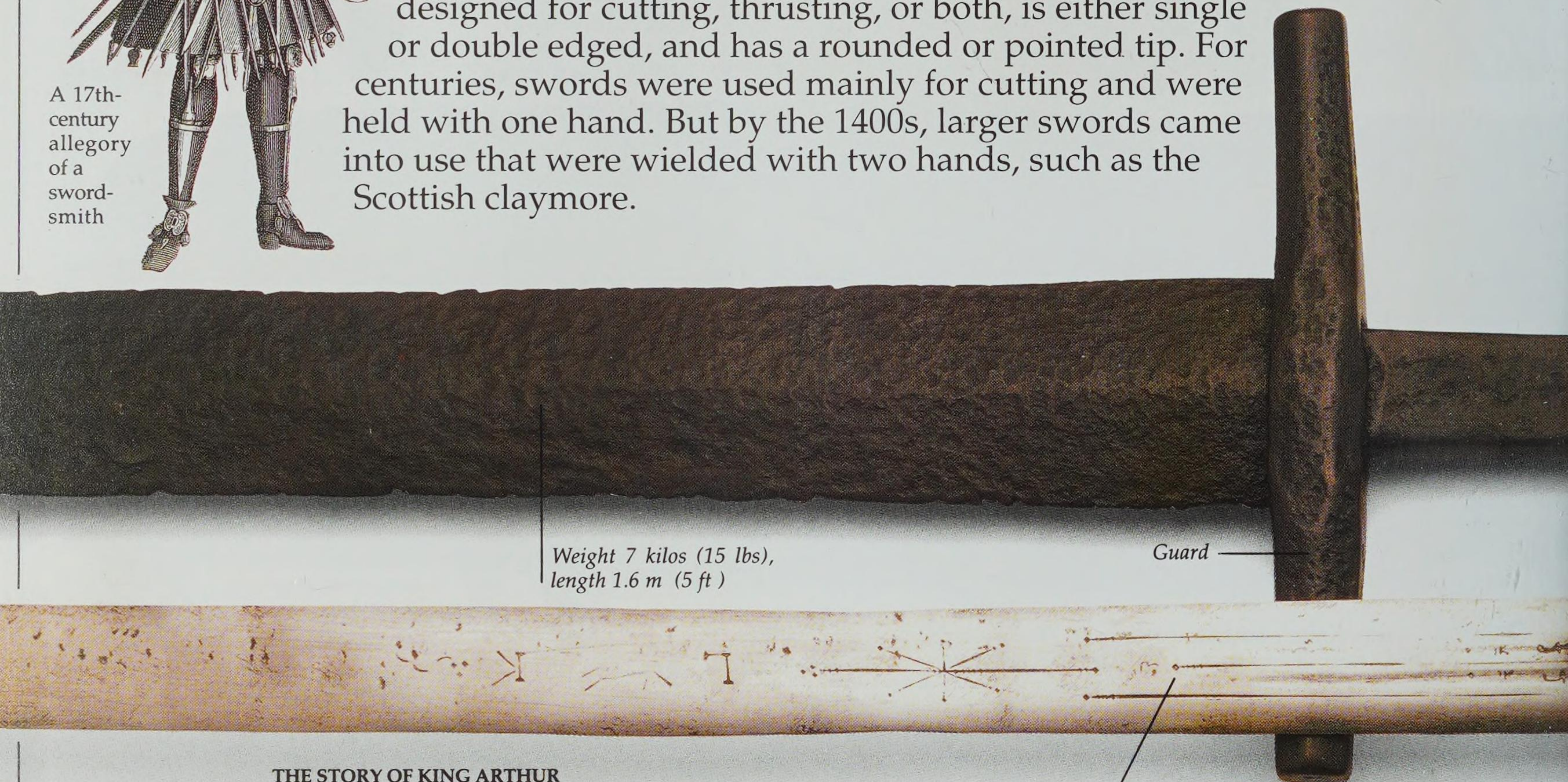




A 17th-century allegory of a sword-smith

# European swords

ONE OF MAN'S OLDEST WEAPONS, a sword consists of a hilt and a blade: the hilt has a pommel for balancing the weapon, a grip for holding it, and a guard for protecting the hand. The blade can be straight or curved and, according to whether the sword is designed for cutting, thrusting, or both, is either single or double edged, and has a rounded or pointed tip. For centuries, swords were used mainly for cutting and were held with one hand. But by the 1400s, larger swords came into use that were wielded with two hands, such as the Scottish claymore.



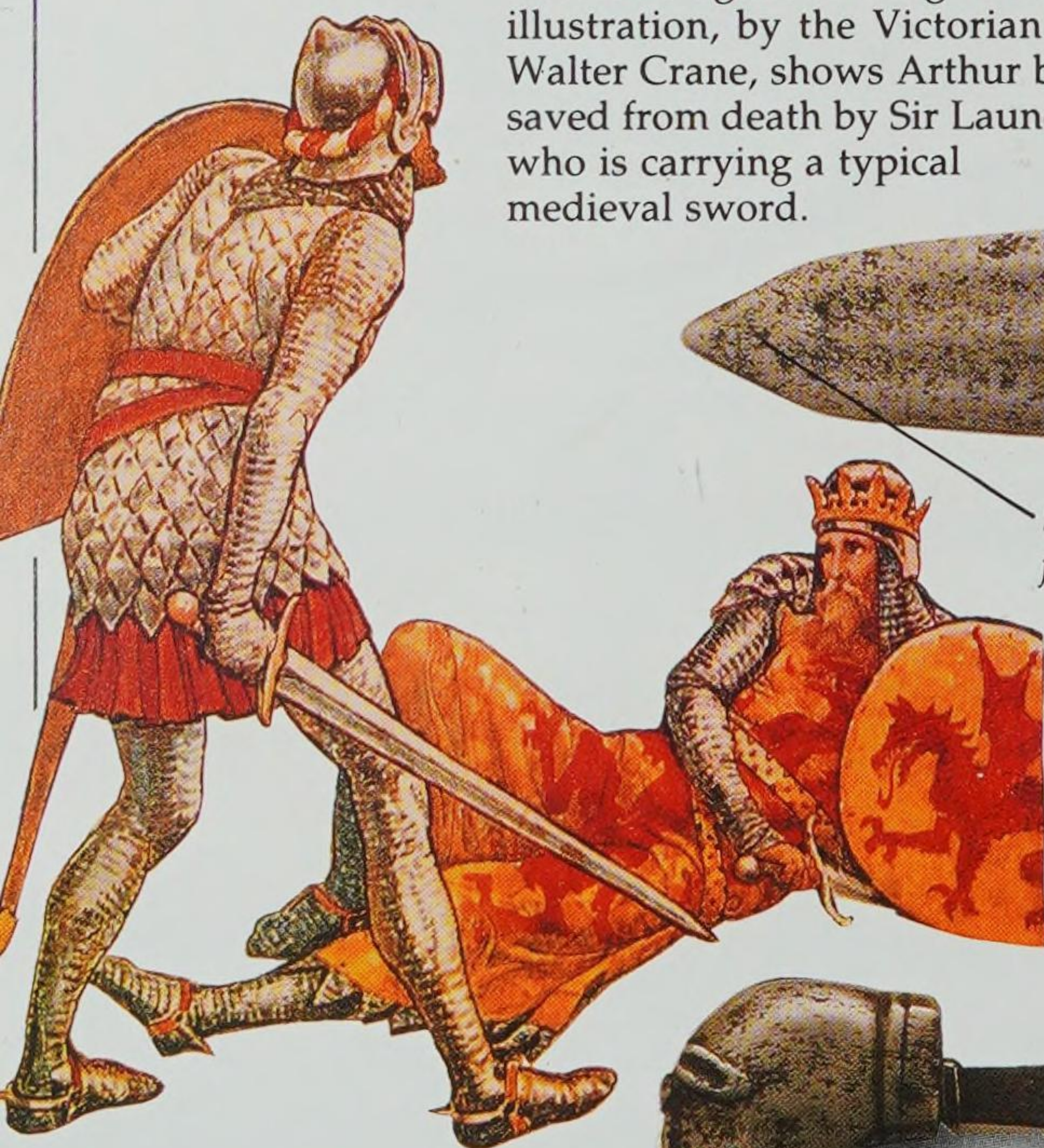
Weight 7 kilos (15 lbs), length 1.6 m (5 ft)

Guard

Long, broad, double-edged blade

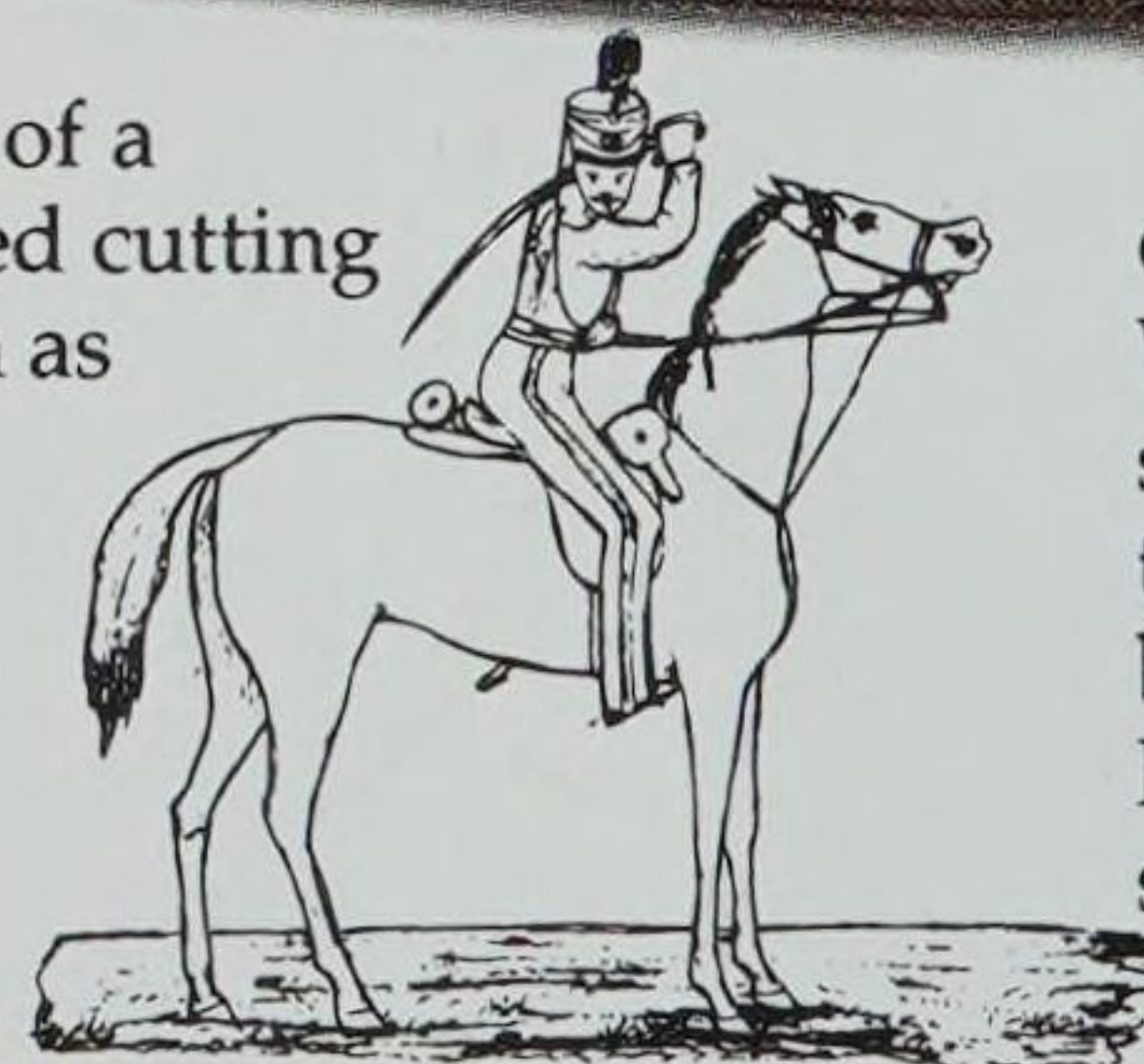
## THE STORY OF KING ARTHUR

There are many versions of the legends surrounding the partly mythical, partly historical figure of King Arthur. This illustration, by the Victorian artist Walter Crane, shows Arthur being saved from death by Sir Launcelot, who is carrying a typical medieval sword.

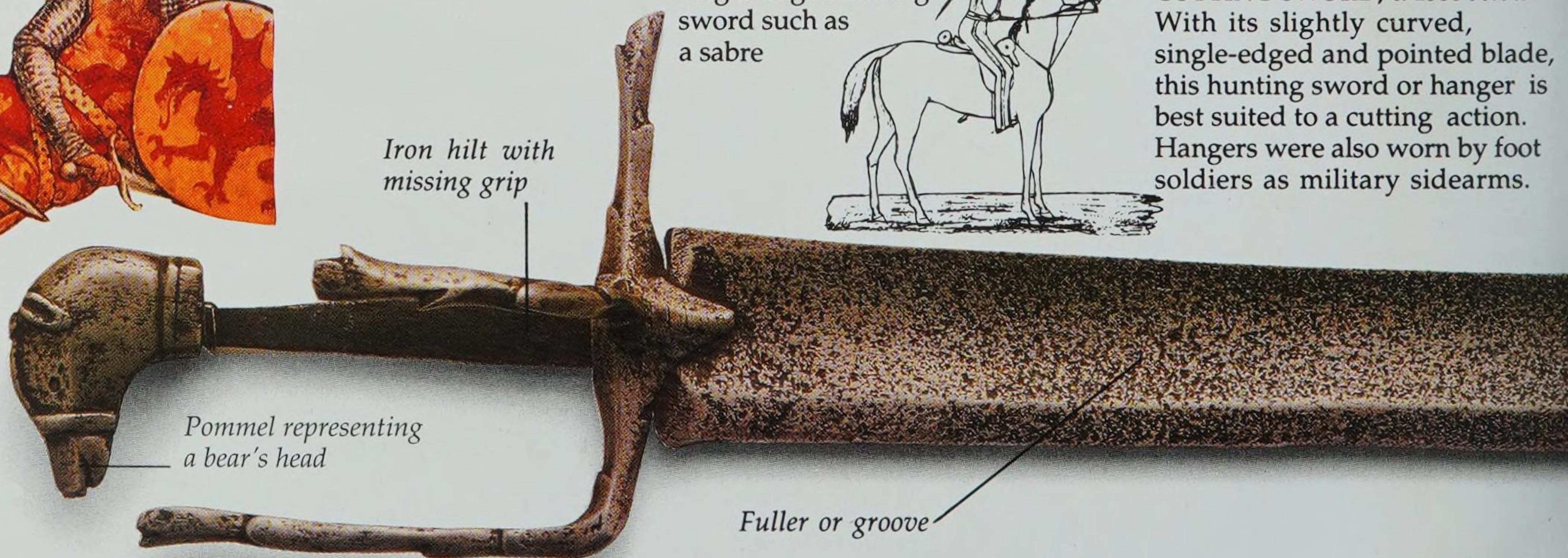


Sharp point for thrusting

The action of a single-edged cutting sword such as a sabre



**CUTTING SWORD, c. 1580 below**  
With its slightly curved, single-edged and pointed blade, this hunting sword or hanger is best suited to a cutting action. Hangers were also worn by foot soldiers as military sidearms.

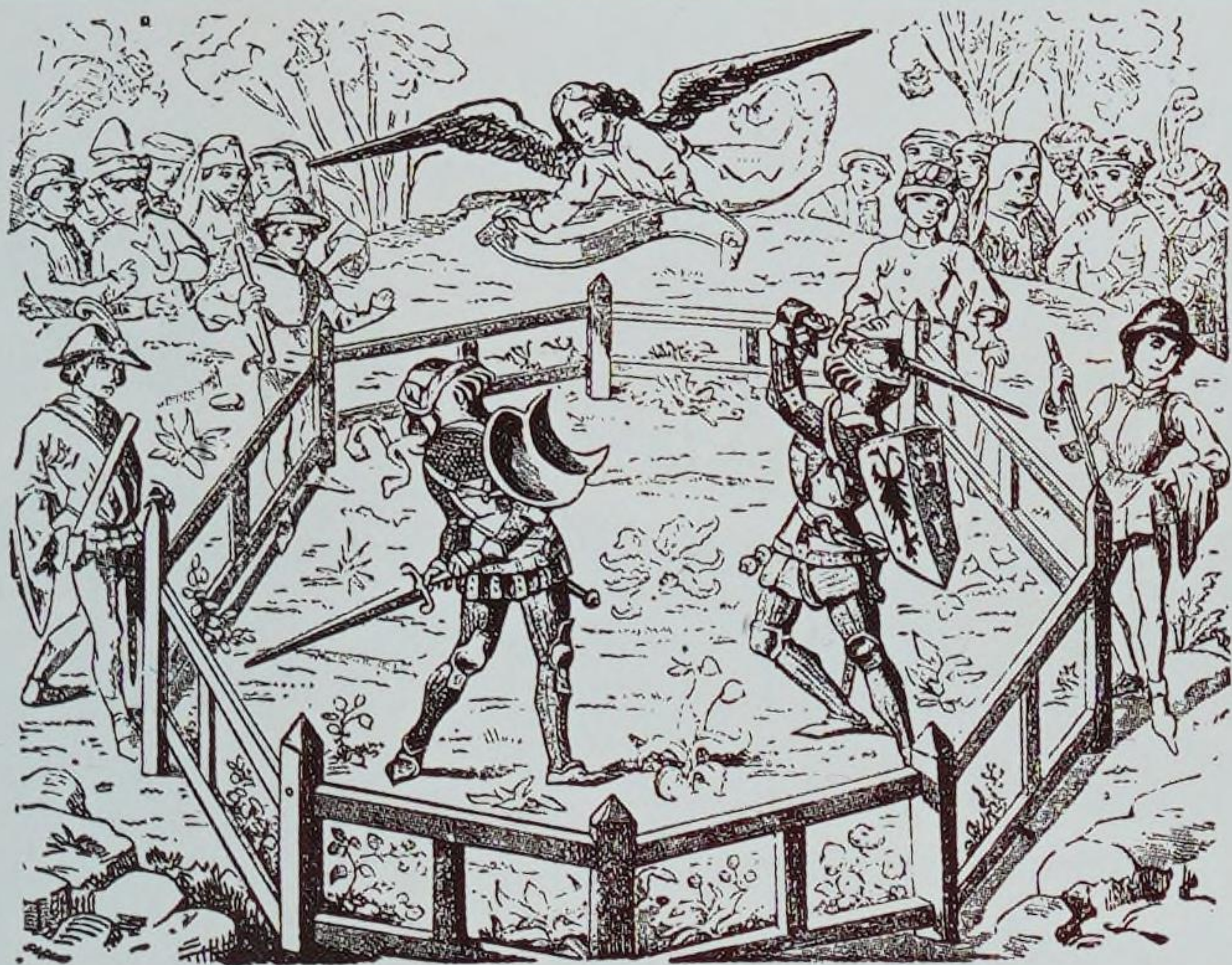


Iron hilt with missing grip

Pommel representing a bear's head

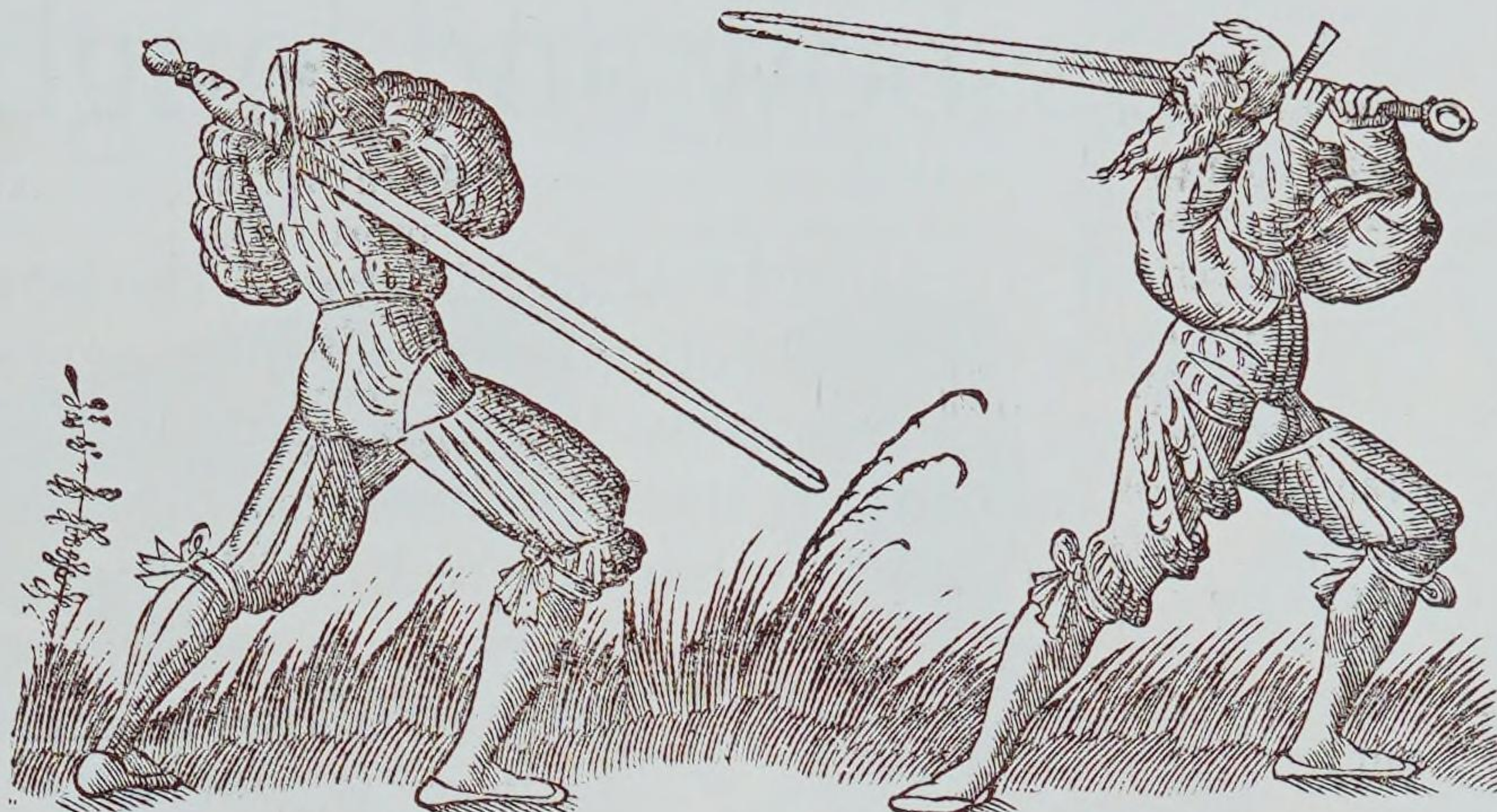
Fuller or groove





#### COMBAT WITH TWO-HAND SWORDS

A 15th-century miniature shows two knights using two-hand swords in personal combat.



#### PERSONAL COMBAT *above*

By the 1500s, swords were used in sporting contests and for fighting duels - personal combats meant to settle private quarrels (pp. 42-43).

#### TWO-HAND SWORD, c. 1300 *left*

The largest swords ever used in combat were the great two-hand swords used by medieval foot soldiers. This vast weapon was probably a ceremonial sword as it would have been too heavy to carry into battle.



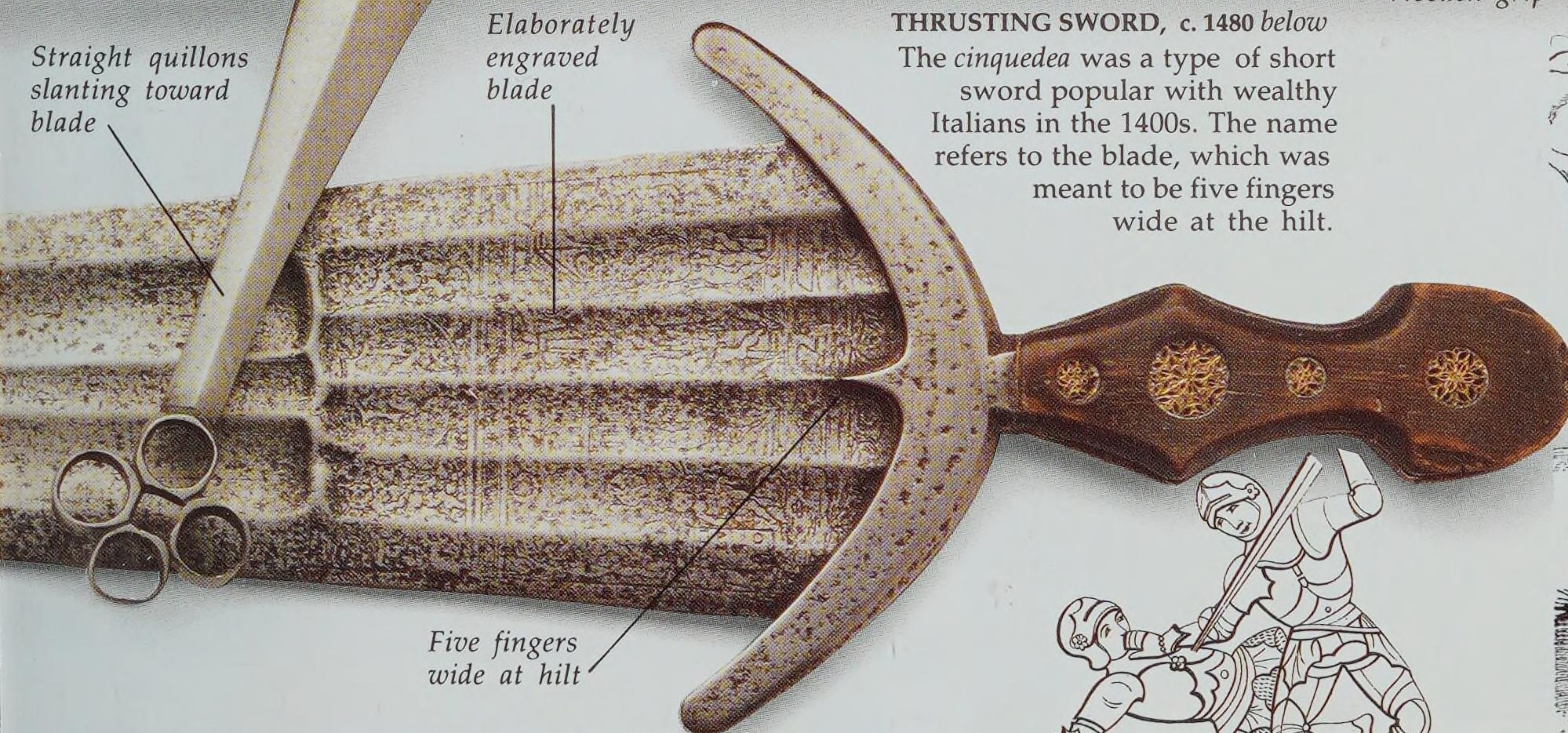
#### SCOTTISH CLAYMORE, c. 1620 *below*

This two-hand sword is the true Scottish claymore, the great double-edged broadsword used by Scottish Highlanders from the 15th to the early 17th century. The word "claymore" comes from the Gaelic *claidheamh-mor*, meaning "great sword".



#### THRUSTING SWORD, c. 1480 *below*

The *cinquedea* was a type of short sword popular with wealthy Italians in the 1400s. The name refers to the blade, which was meant to be five fingers wide at the hilt.

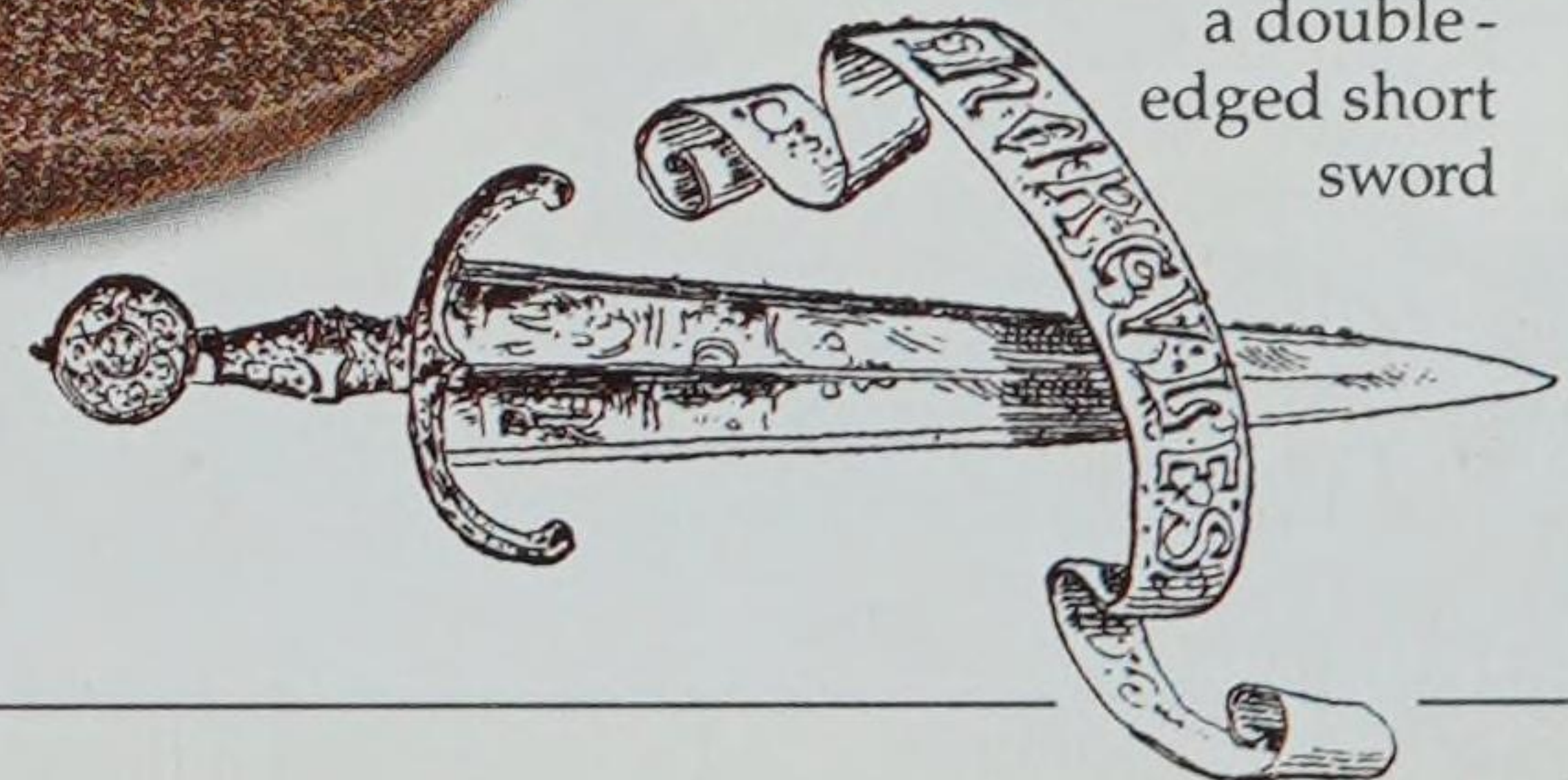
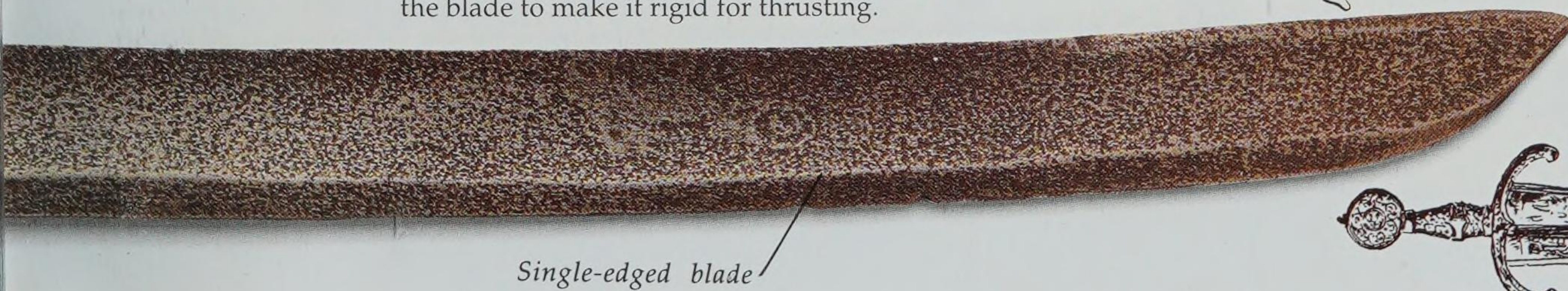


#### PIERCING ARMOUR *right*

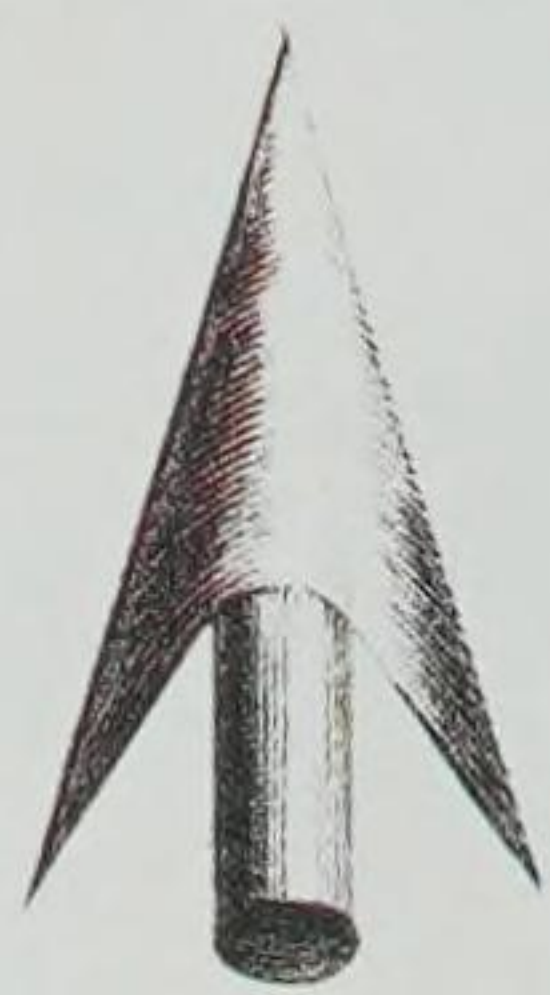
This man-at-arms (right) has an acutely pointed sword with a rib running down the middle of the blade to make it rigid for thrusting.



A 16th-century German standard bearer wearing a double-edged short sword







# Crossbow and longbow

**D**URING THE MIDDLE AGES the use of the bow in both hunting and battle was revolutionized by the appearance of the longbow and the crossbow. By combining archery with simple machinery, the crossbow often proved a more deadly weapon than the ordinary bow (p. 9). Indeed, some

crossbows were so powerfully made that they had to be loaded by a variety of mechanical devices. But despite the crossbow's greater range, it had a slower rate of fire than the longbow and was more expensive to make. The longbow was a much improved version of the ordinary bow and at a range of 91 m (300 ft) its steel-tipped arrows were deadly. With neither weapon having a clear lead over the other, many medieval armies had both longbowmen and crossbowmen.



Medieval iron arrowheads



Longbowmen, from a 15th-century manuscript



SOLDIER USING WINDLASS

Crossbows had a slow rate of fire because they had to be wound to pull back the bowstring before they could be shot. They were more useful, therefore, in sieges, where the rate of fire was less important.

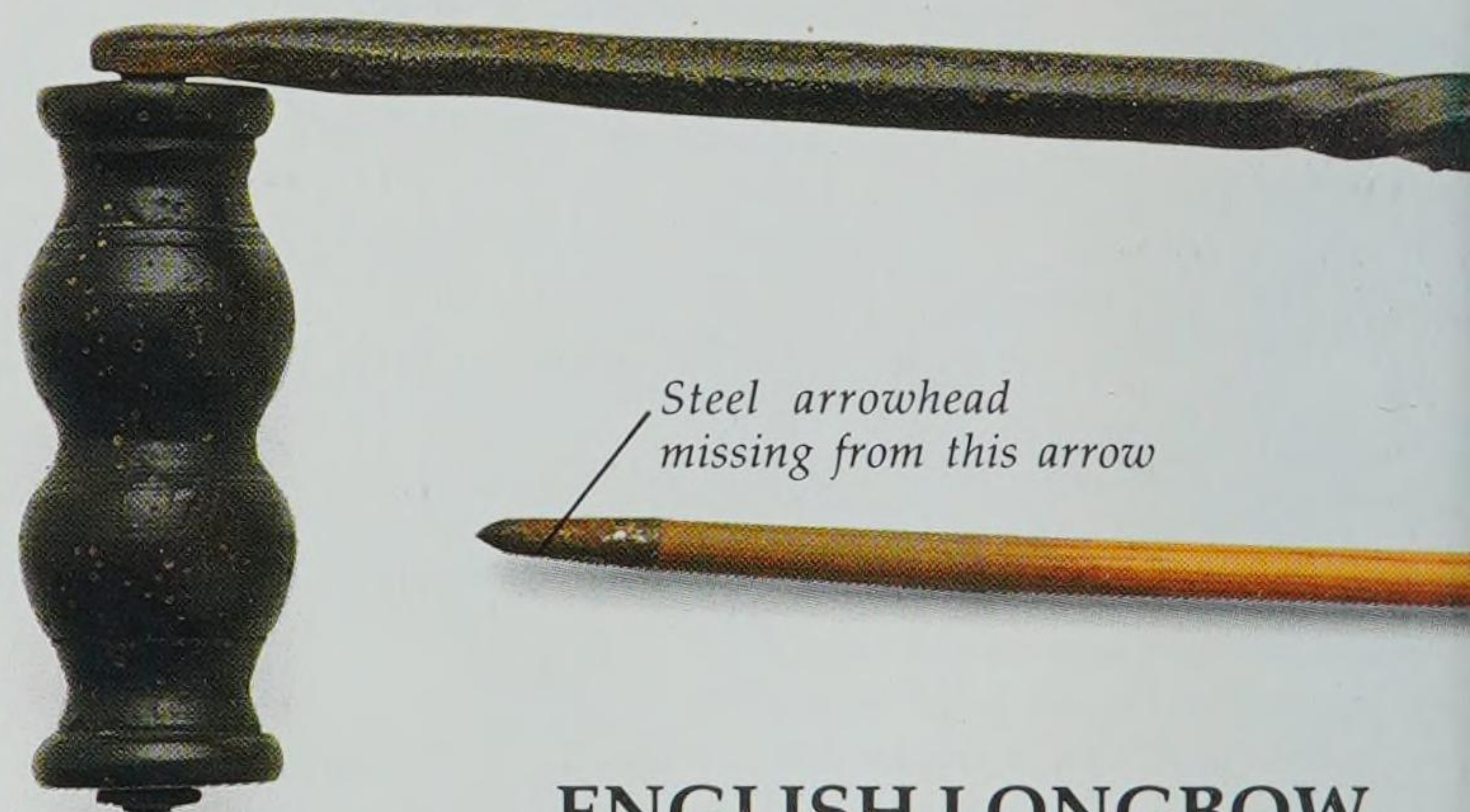


## Firing a crossbow

- 1 Bowstring held in spanned (loaded) position by a rotating catch (the nut) set in crossbow tiller.
- 2 Bolt laid in groove along the top of stock and aimed by pressing rear of stock to cheek.
- 3 Bolt then released by pressing up the rear end of the trigger.

### ARCHERS DEFENDING A CITY *left*

During the 15th century, many fortified towns trained archers to defend the city to which they belonged.

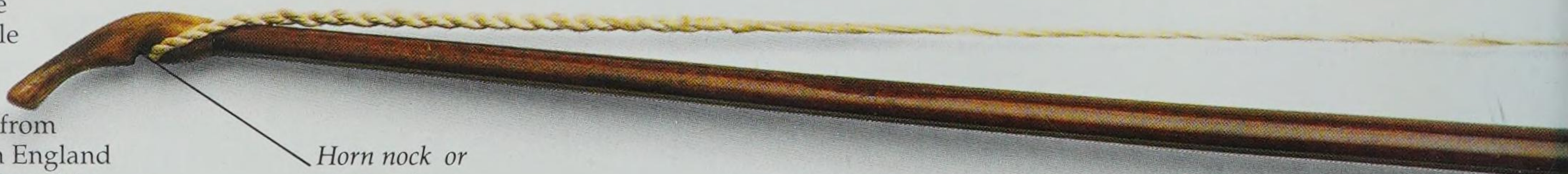


Steel arrowhead missing from this arrow

## ENGLISH LONGBOW, c. 19th century

### ENGLISH YEW LONGBOW

Constructed from a single piece of wood, usually yew, the longbow was a formidable weapon when shot by highly trained archers. Longbow lengths varied from country to country, but in England the bow was usually the breadth of an archer's span between his outstretched arms, which in a tall man would equal his height.



Horn nock or groove for attaching bowstring



Hook for  
attaching to  
bowstring

#### SPANNING LEVER

The goat's foot lever was a tool used for spanning small crossbows. The limbs slid over pivots on either side of the bow's stock and the handle was then pulled back.

**ROBIN HOOD**  
The legendary English outlaw Robin Hood has always been associated with the longbow. Many of the ballads recounting his deeds tell of his skill as an archer.



Lever handle

Windlass  
handle

Curved limbs  
for sliding  
over stock

Crank

#### THE WINDLASS

The windlass was a box-shaped base into which the butt of the crossbow's stock was fitted. Cords ran from the box over pulleys (see next page), which cut down on the amount of effort needed to pull back the powerful bowstring.

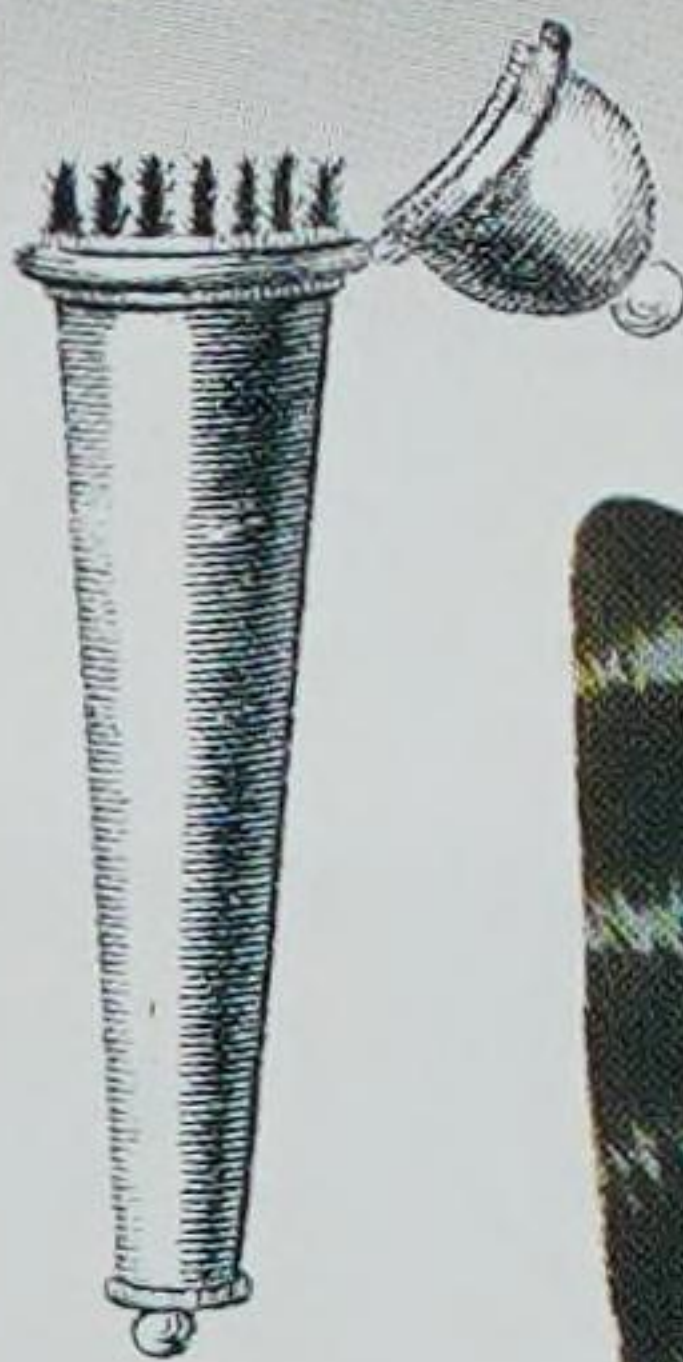
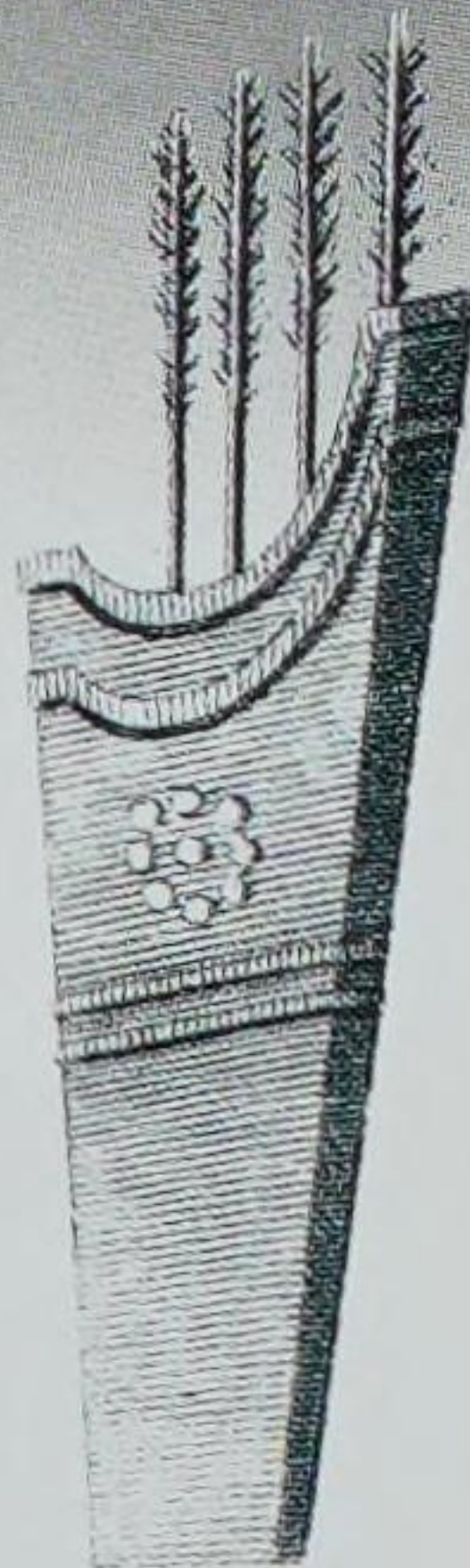
Windlass  
socket

### FLEMISH CROSSBOW with windlass, c. 16th century

Shaft

#### QUIVERS

Longbow arrows were usually carried in bags or thrust through the belt. Later, arrows were carried in quivers (right).

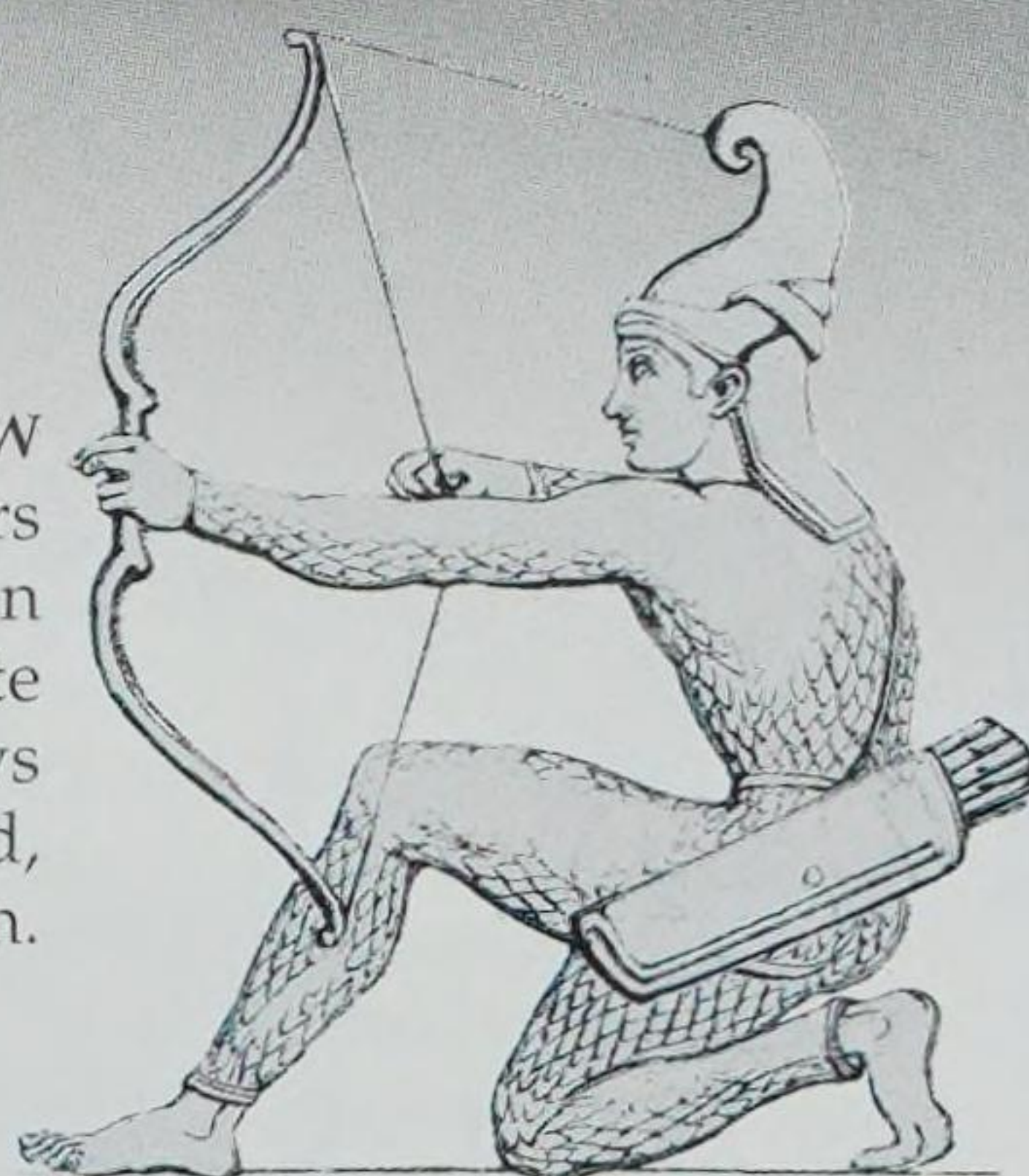


Groove or nock  
(for keeping  
arrow in place  
on bowstring)

Trigger

Stock or tiller

**PERSIAN BOW**  
Persian warriors (p. 32) often carried composite recurved bows made of wood, sinew, and horn.



#### Longbow Arrows

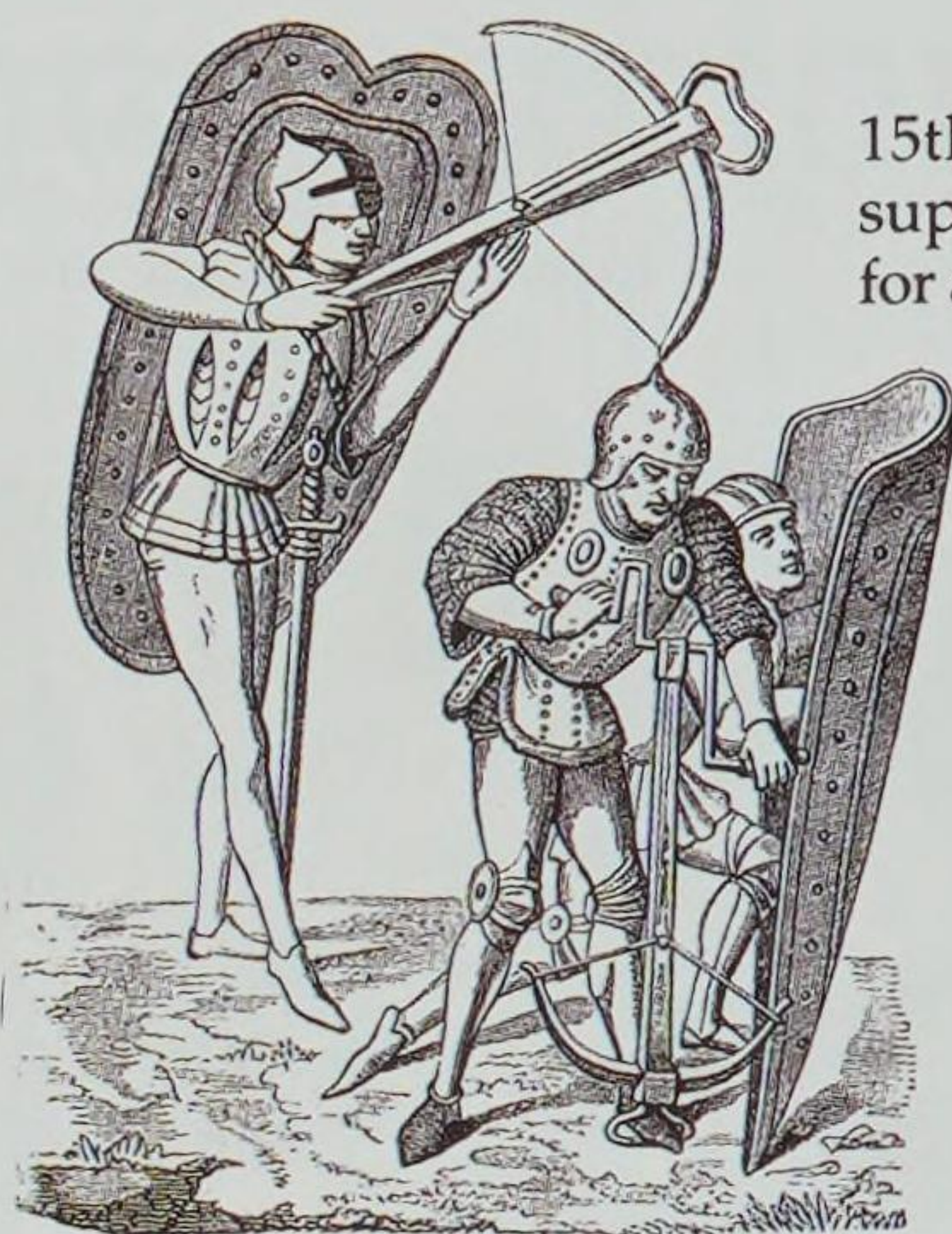
The length of a longbow arrow was dependent on the length of the bow. Shafts were made of ash or birch, arrowheads of iron, and flights came from the wings of geese.

Flights or fletchings

Bowstring usually made  
of hemp or flax

Grip





15th-century soldier supporting a pavise for a crossbowman

Mid 15th-century pavise or shield

16th-century crossbow bolt for warfare and hunting



Wooden shaft

**MILITARY CROSSBOW BOLT** *above*  
The accuracy and deadly penetration of bolts shot from the large military crossbows meant they could easily wound or kill a man at a distance of 183 m (600 ft).



Hook

Pulley

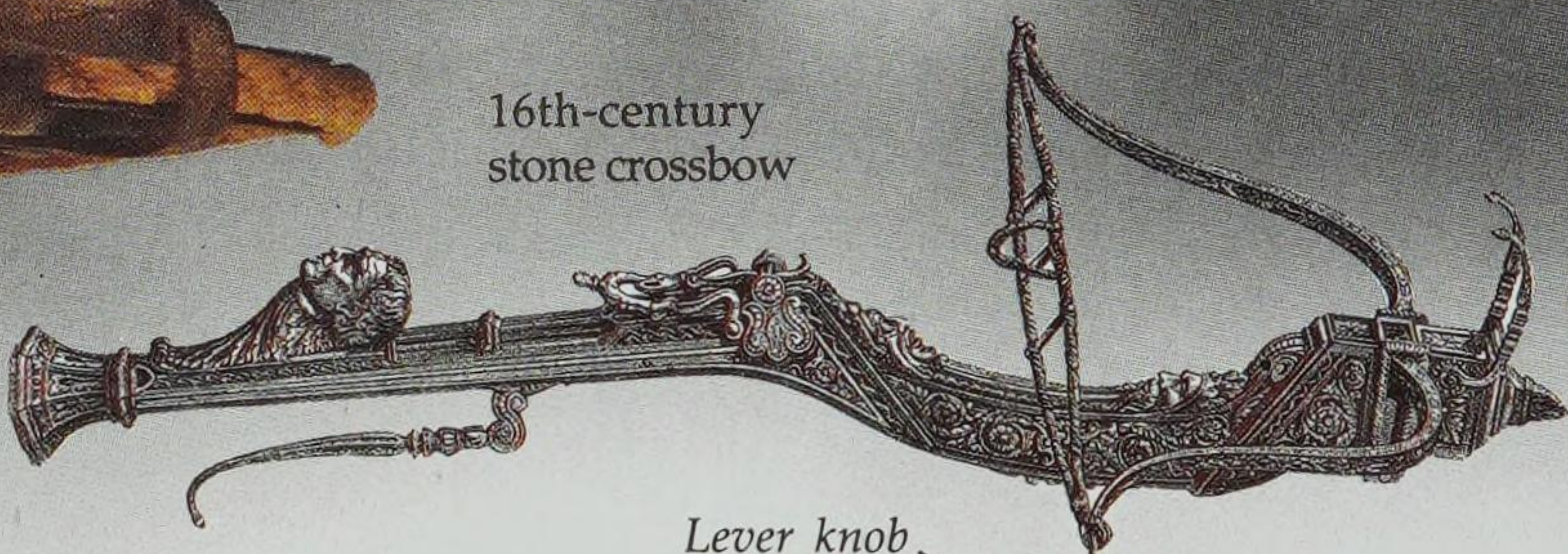
Leather flight

Release nut

Hemp bowstring

Groove where bolt fitted

16th-century stone crossbow



Lever knob

## ENGLISH BULLET CROSSBOW, early 18th century

**LEVER FOR LOADING CROSSBOW**  
Because bullet-firing crossbows were small and light they could be spanned by hand. The crossbowman placed his weapon against his chest and then operated a built-in bending lever by pressing a knob in the weapon's butt.



Butt

Stock or tiller

Trigger

Bowstring

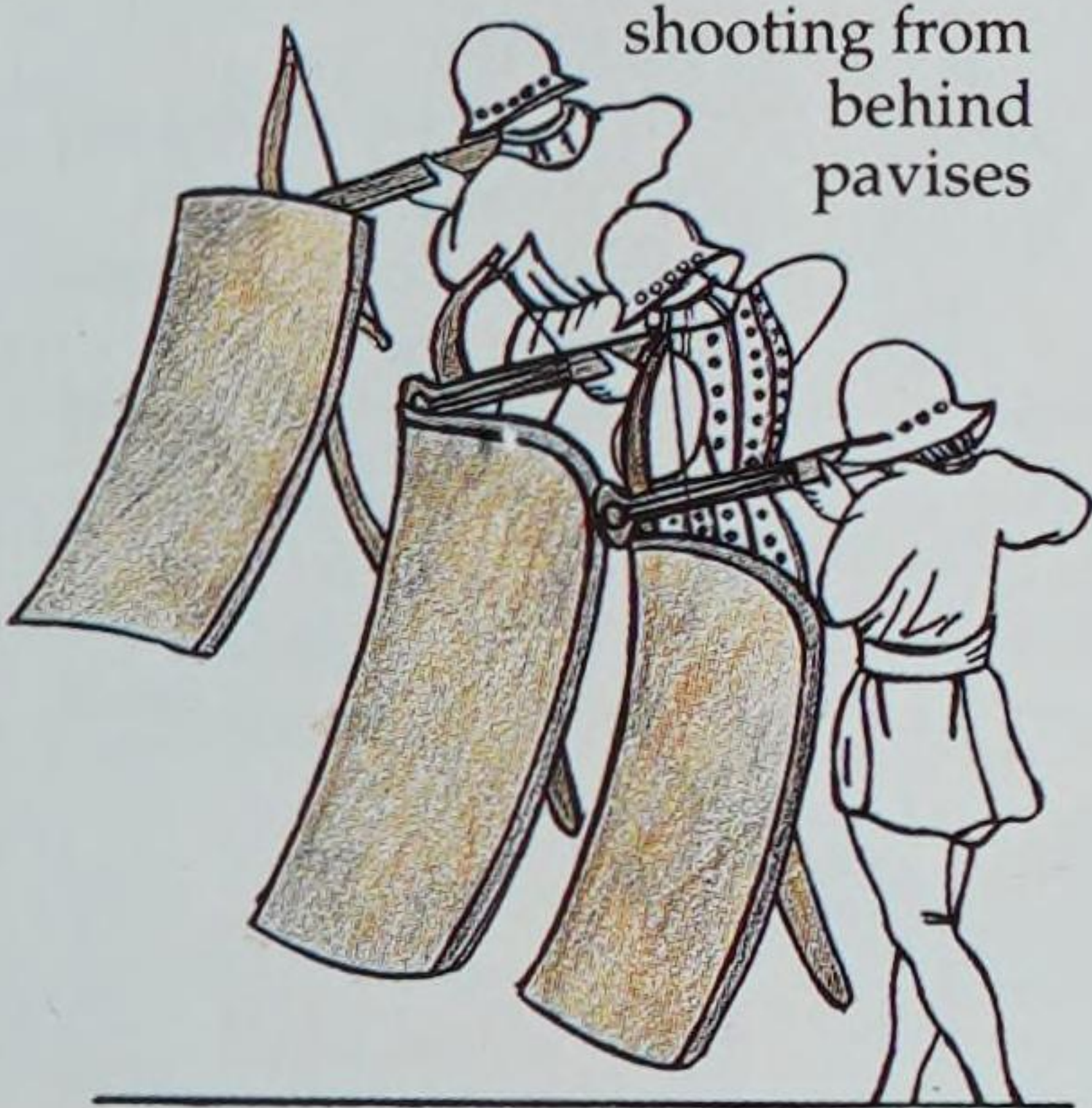
Foresight pillar

16th-century, highly ornamented sporting crossbow

**BULLET CROSSBOW** *above*  
Bullet crossbows were popular from the late 18th century to the early 19th century for both target practise and shooting small game. They had double bowstrings with a pouch in the centre for the bullet.



A group of 15th-century French crossbowmen shooting from behind pavises



**WILLIAM TELL**  
According to legend, the national hero of Switzerland, William Tell, was forced to shoot an apple from the head of his own son with a crossbow. Tell was being punished for refusing to swear allegiance to the Austrians, who ruled his country in the 1300s.



Iron bolt heads

Two 16th-century military bolts

Steel tip

Stirrup (foot strap)

Backsight

#### BACKSIGHT

Backsights, situated in the middle of bullet and stone crossbows, had a number of apertures for sighting to different distances. The backsight in this weapon is lying flat and would have been pulled into an upright position for firing.

#### INCENDIARY ARROWS

Incendiary arrows and bolts were used in warfare until the 1600s. A wad of hemp or flax was soaked in a bituminous substance, fixed beneath the arrowhead, and then lit just before the arrow was shot.



Sighting bead

Double bowstring with leather pouch

#### SIGHTING BEAD

A moveable sighting bead hung between the foresight pillars of bullet-firing crossbows.

Nock



# Axes, daggers, and knives



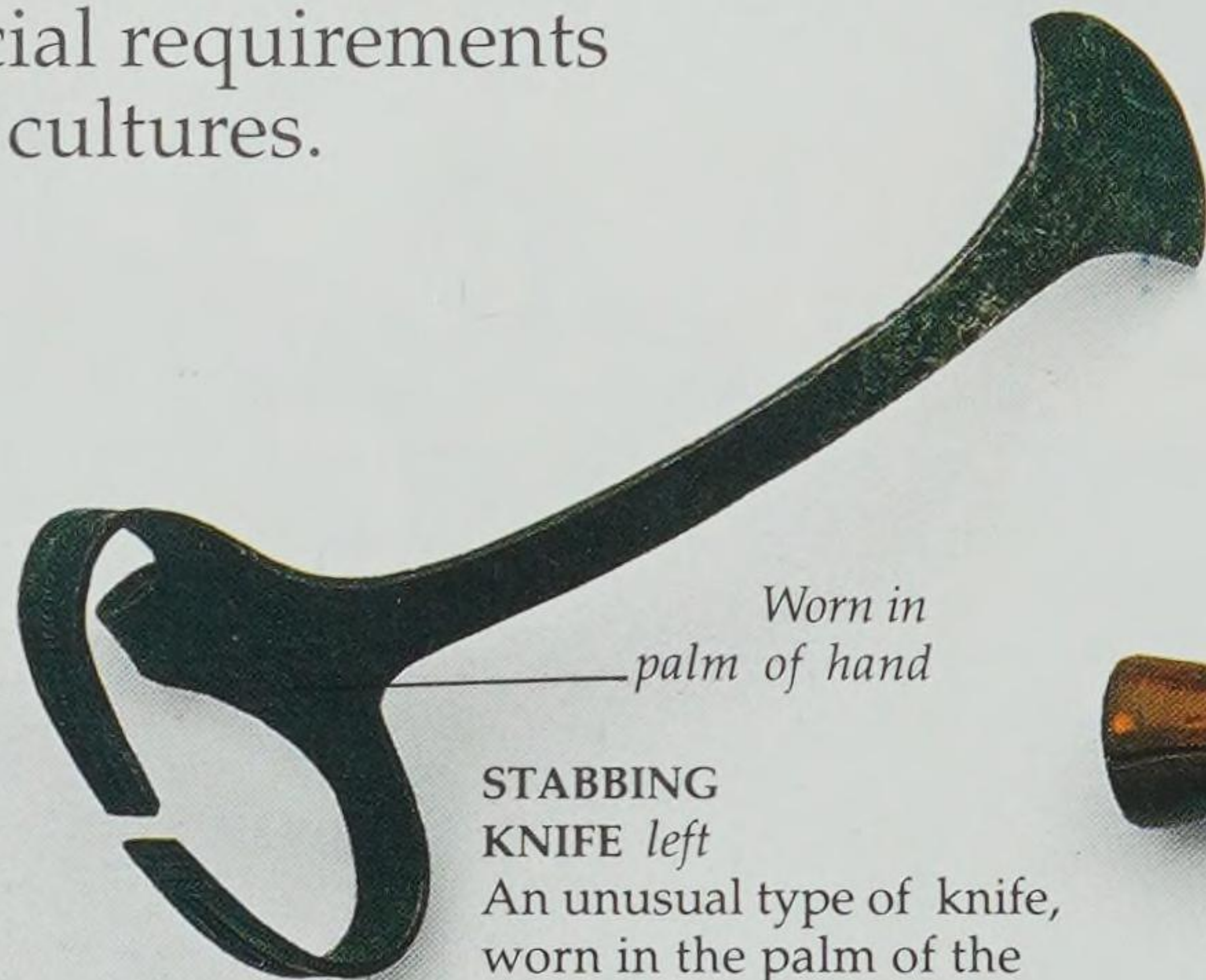
19th-century American infantryman carrying a bowie knife

**A**XES, DAGGERS, AND KNIVES have been used as weapons since prehistoric times (pp. 6-7).

At first, axe heads were made of stone or bronze, but by the Middle Ages they were usually made of steel or iron, and often had additional spikes or projections to make them appear even more formidable. Daggers usually have two sharp edges running into a point and are essentially used for stabbing or cutting. Knives usually have a single-edged blade.

By looking at a selection of axes, daggers, and knives from all over the world, it is possible to see how different countries produce blades

and shafts to suit their own special requirements and cultures.



Worn in palm of hand

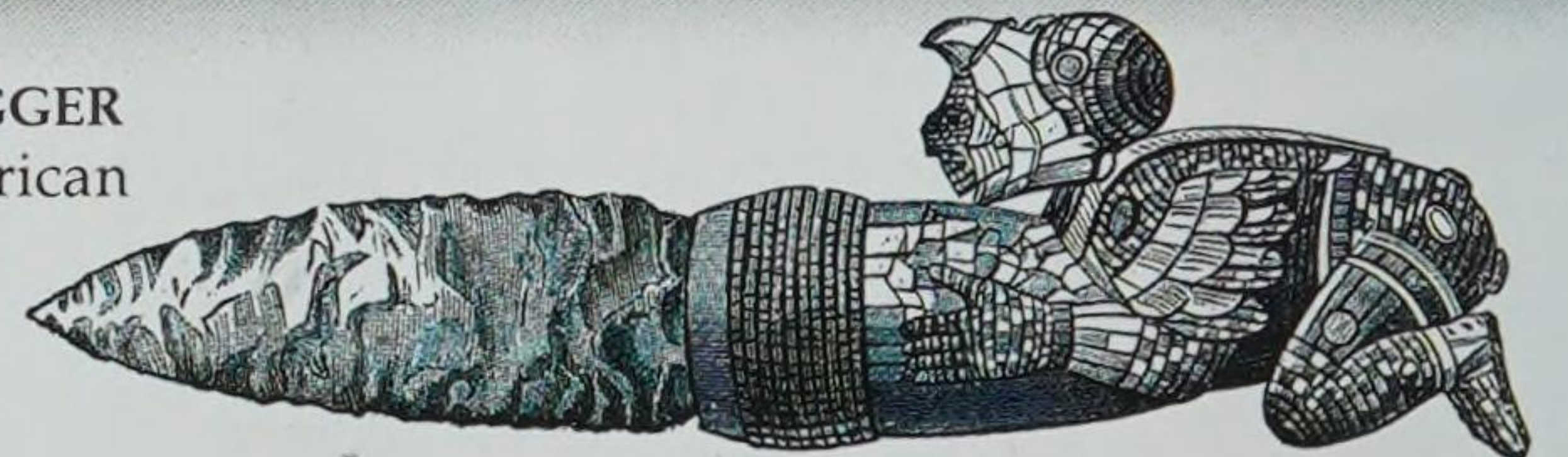
## STABBING KNIFE left

An unusual type of knife, worn in the palm of the hand and then thrust forward by the user. It was made by northern Nigerian tribespeople.



## AZTEC DAGGER

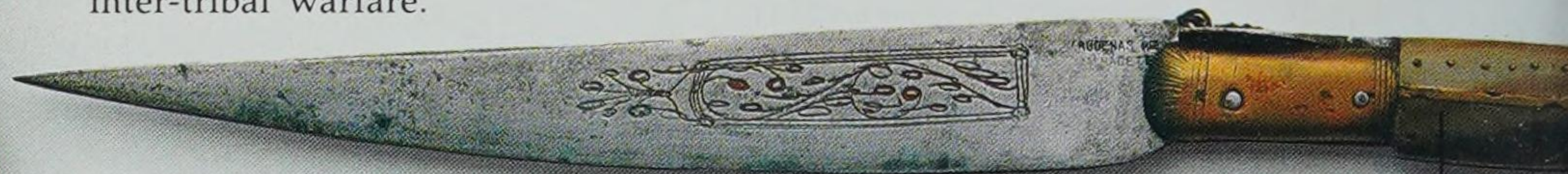
The Aztecs, Middle American Indians who once dominated Mexico, made this flint dagger with a mosaic handle.



## NAGA WAR AXE above

The *dao* is an impressive-looking all-purpose weapon used by the former head-hunting peoples from the Naga Hills of Assam in their inter-tribal warfare.

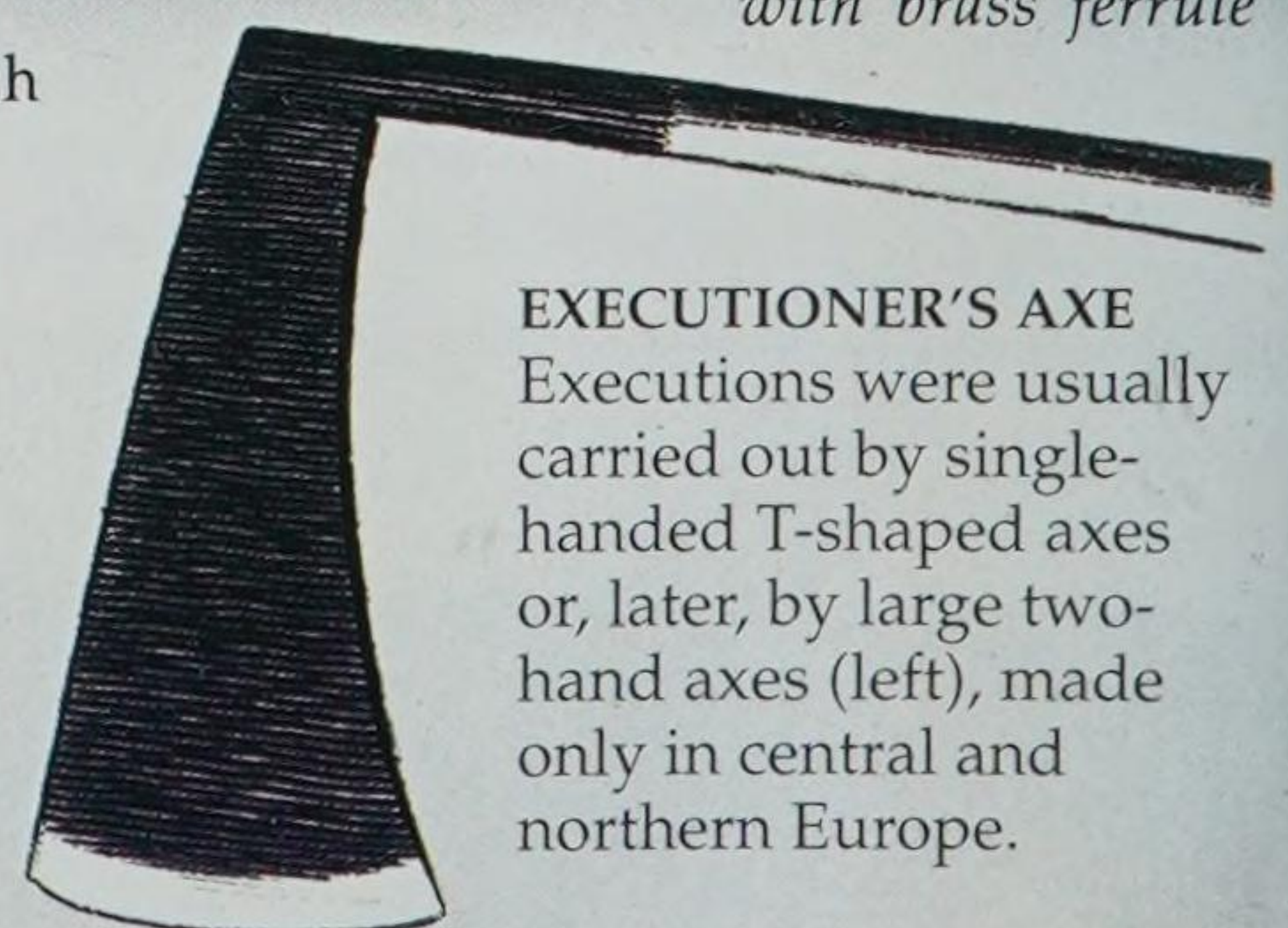
Long bamboo haft partly bound with rings of plaited cane



## FOLDING KNIFE above

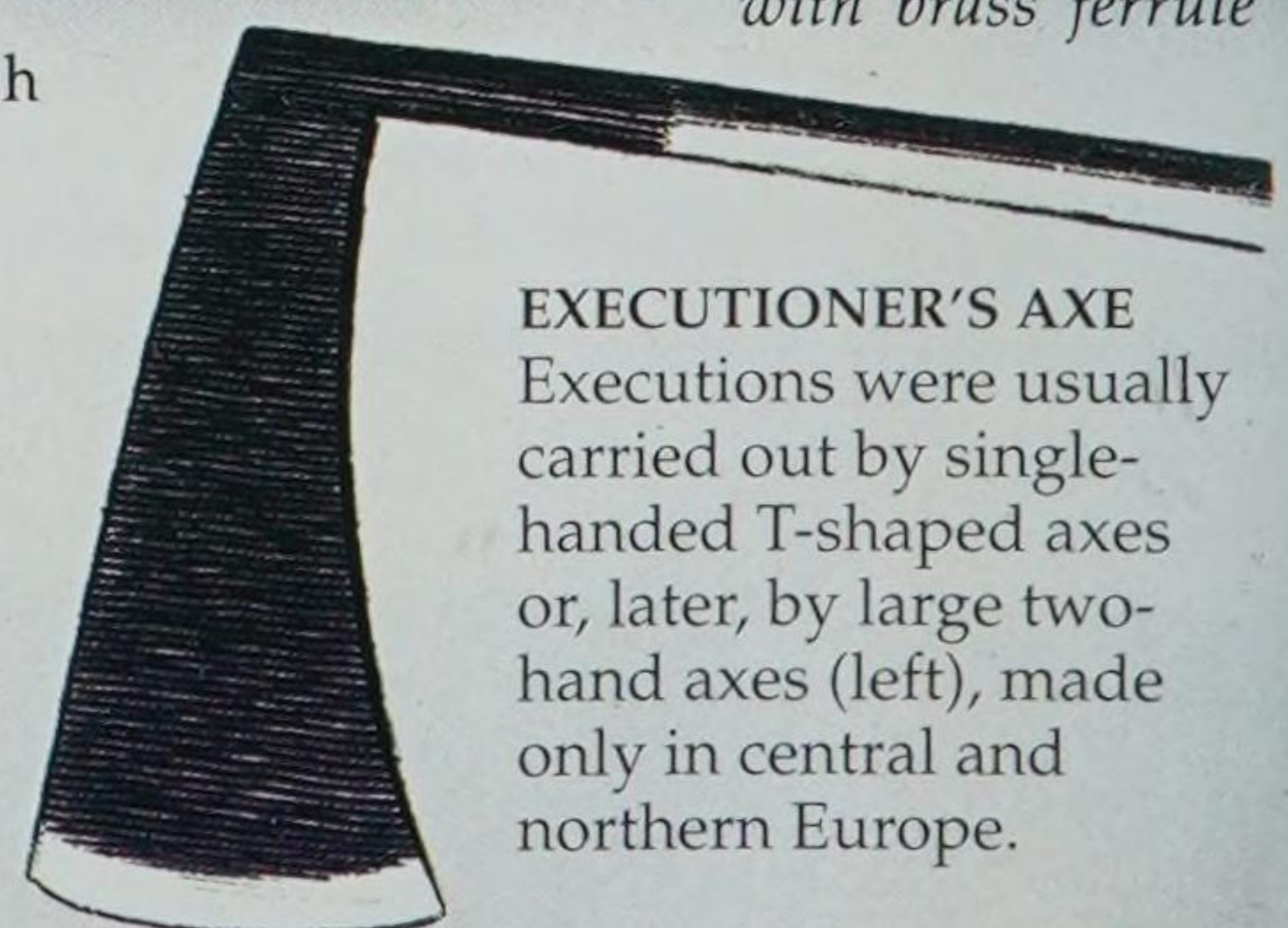
In this late 19th-century Spanish knife the blade folds back to sit partly within the hilt. The blade was locked into place by a steel spring in the hilt.

Hilt made of horn with brass ferrule



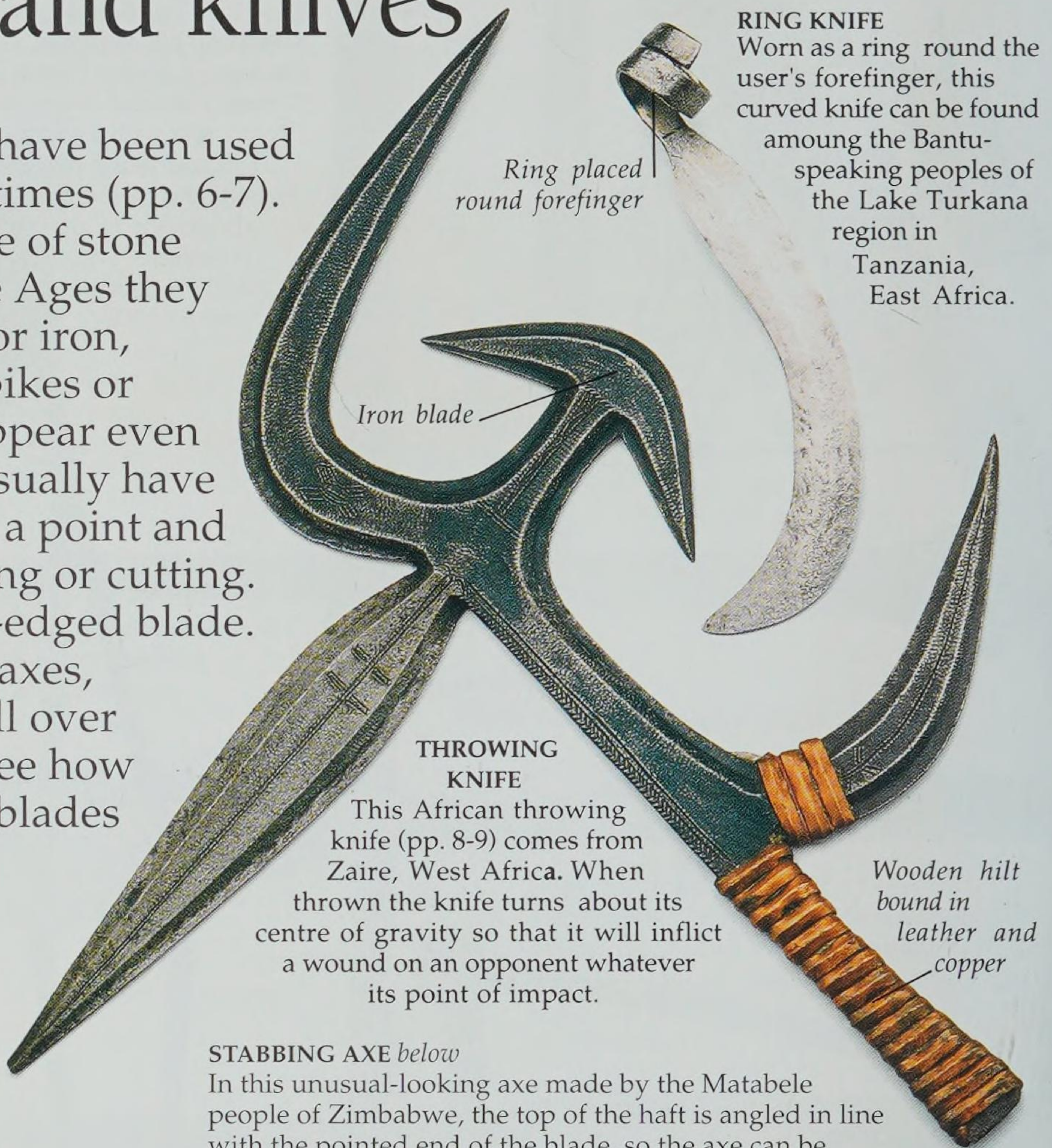
## EXECUTIONER'S AXE

Executions were usually carried out by single-handed T-shaped axes or, later, by large two-hand axes (left), made only in central and northern Europe.



## STABBING AXE below

In this unusual-looking axe made by the Matabele people of Zimbabwe, the top of the haft is angled in line with the pointed end of the blade, so the axe can be used with a stabbing as well as a chopping action.



## THROWING KNIFE

This African throwing knife (pp. 8-9) comes from Zaire, West Africa. When thrown the knife turns about its centre of gravity so that it will inflict a wound on an opponent whatever its point of impact.

Wooden hilt bound in leather and copper

Iron blade

Ring placed round forefinger

**RING KNIFE**  
Worn as a ring round the user's forefinger, this curved knife can be found among the Bantu-speaking peoples of the Lake Turkana region in Tanzania, East Africa.



Plume of dyed animal hair





**IGOROT AXE**

Used as a tool as well as a weapon, this axe with its beautifully decorated haft was made by the Igorot or "Mountain People" of North Luzon in the Philippines.

Long slender blade with pronounced curve to cutting edge

**MALAY DAGGER** below

The dagger called a kris plays an important role in Malay culture with different areas having their own form of blade and hilt.

Ivory handle in form of Garuda, a mythological eagle

Characteristic wavy blade

Double-edged curved blade

**SUDANESE DAGGER** above

Of Arabian origin, a *jambiya* is used for both war and ceremony in the Middle East and India.

Hilt of carved horn with silver mounts and studs made of beaten silver coins

**BATTLE-AXE PISTOL** above

An elaborately decorated combination axe and wheel-lock pistol (p. 38), made for a 16th-century nobleman.

Short heavy two-edged blade

Decorated in silver and gold

Brass elephant's head decoration

**INDIAN BATTLE-AXE**

Known as a *bhuja*, this knife-like battle-axe from north India is also called an "elephant's head" because of the characteristic decoration often found between the shaft and blade.

Covered cutting edge

Single-edged blade

**WRIST KNIFE**

A knife with a razor-sharp cutting edge (shown with a protective covering for safe handling), worn round the wrist. Made by the Suks of Kenya.

Pointed blade with long cutting edge

Hilt made of antler riveted to tang of blade

**BOWIE KNIFE**

This example of the hunting knife associated with the American frontiersman James Bowie was made in San Francisco in 1906.

Hollow metal haft for concealed dagger

Gilded pommel forms a handle for a concealed screw-in dagger





**EARLY LEG DEFENSE**  
An Italian relief, c.1289, showing medieval leather leg protection.

# Mail and plate armour

**MAIL** - ARMOUR MADE from linked iron rings - was probably introduced by the Celts (pp. 10-11) and was common in western Europe until the 14th century. Mail was flexible, so the links did not tear easily. However, a blow could still break bones. Mail also gave poor protection against the increasing use of armour-piercing arrows and sharp weapon points. At first, plate armour (introduced gradually in the 13th century) was simply added to mail armour. But from the 1400s, knights went to war entirely encased in suits of plate armour.

**MAIL SHIRT**  
This oriental mail shirt is made of solid rings - made without any join. European mail was usually riveted - each ring end flattened, and linked by a rivet.

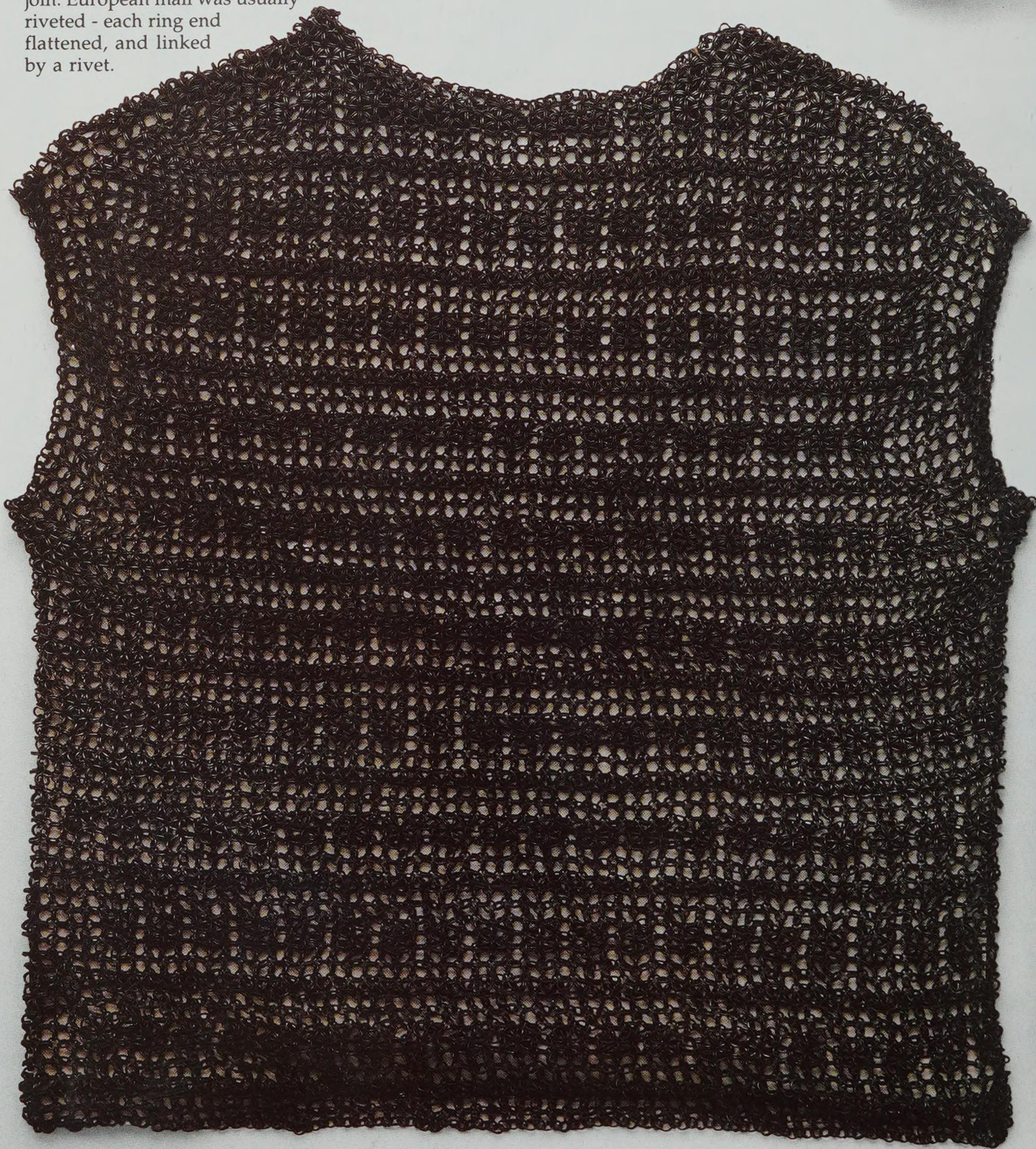


An armoured knight in an attitude of devotion, c. 1250

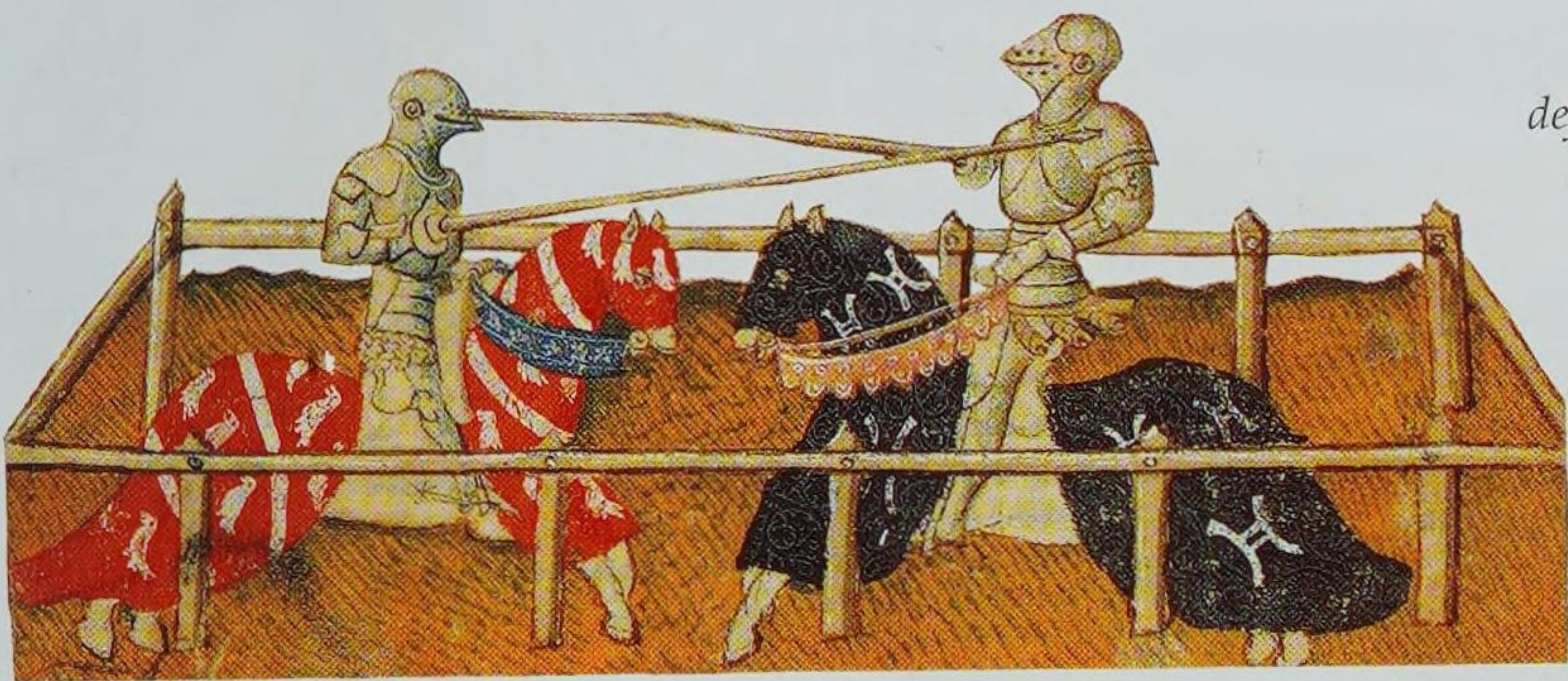
**POLLAXE**, c. 1580 *right*  
This armour-piercing French weapon originally had a longer shaft for use by knights fighting on foot.



**MEDIEVAL KNIGHT IN MAIL NECK DEFENCE**  
Detail from a window in the Palace of Westminster.







**A JOUST AT TOURS, c. 1446**  
When jousting at tournaments (pp. 30-31) with sharp lances (above), knights wore armour similar to that used in battle.

Long sharp point at back of weapon balanced by blunt claws in front



**GERMAN KNIGHT**  
A coloured engraving of a full-armed knight, drawn in about 1500. He is dressed in Maximilian armour designed for the Rennen – a joust with sharp lances in the tournament (pp. 30-31).

Decorated with etched and gilded heavenly figures

Lance-rest for tilting (pp. 30-31)

Straps for attaching metal plate skirts to longer plates called tassets (p. 26)

Back plate of articulated steel plates, the last of which is shaped to the knuckles



**AN ARMOURER'S WORKSHOP IN INNSBRUCK, c. 1517**  
A specially strong type of armour, made in Germany and Austria during the 16th century, was called Maximilian armour after the Hapsburg emperor, Maximilian I. In this engraving, Maximilian is visiting his chief armourer.

Roped turns for deflecting weapons

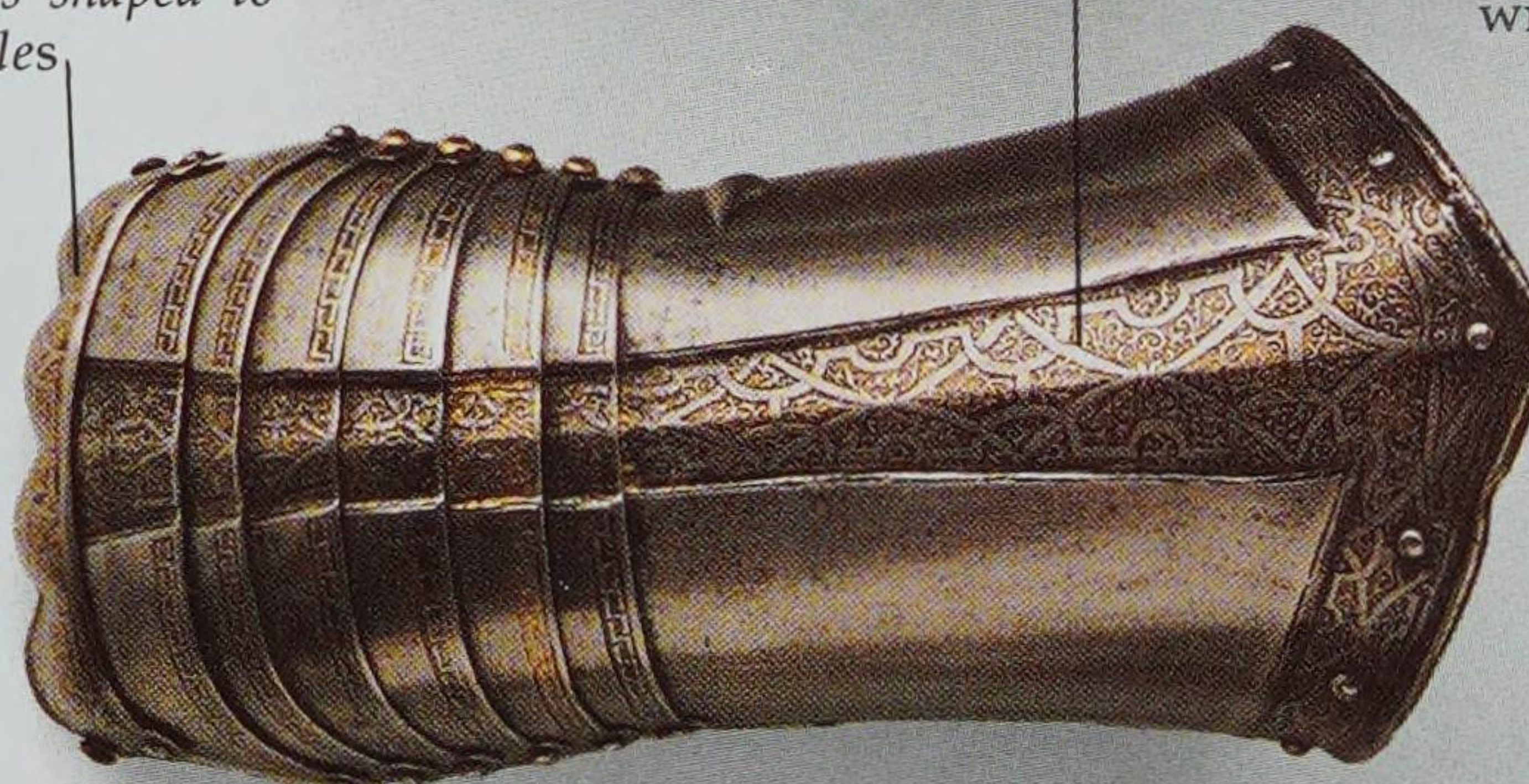
**BREASTPLATE, c. 1570**  
Made by a renowned Italian armourer, this light, strong, one-piece breastplate is a technically perfect piece of plate armour. Its style imitates the shape of a 16th-century doublet (close-fitting jacket).

Straps for attaching to a backplate



One plate, the cuff, covers the wrist

**GAUNTLET, c. 1580 left**  
Made in north Germany, this gauntlet - the piece of armour that protected the hand and wrist - shows the intricacy and skill with which high-quality plate armour was made.



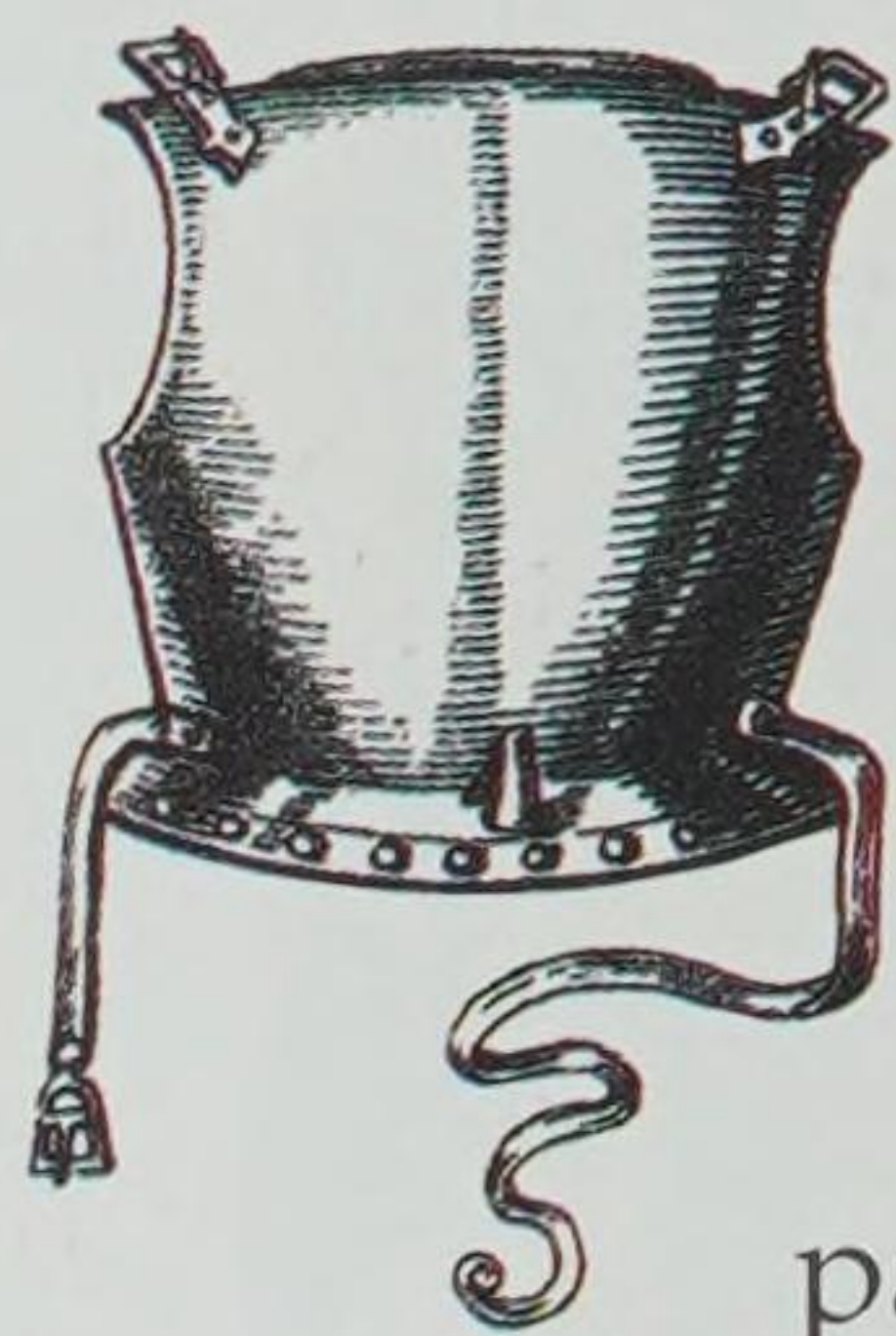
**SABATON, c. 1450 below**  
As with the gauntlet (above), the part of the armour that protected the foot had to allow for maximum movement, by having well-made articulated plates along the length of the foot.

Exaggerated long pointed toe cap, articulated where foot bends





# A suit of armour



By the middle of the 15th century a fully armed knight was virtually encased in plate armour. However, due to the skill of the late medieval armourer, he was not as restricted as he might appear; the armour joints were designed to permit a large amount of movement. The suit of armour on these

pages, belonging to a mid-16th century knight, was made in an Italian workshop - the northern Italians and the southern Germans were the most celebrated armourers in Europe.

Upper bevor can be raised with the visor, to get more air or to eat and drink

Hinge and pivot

**PROTECTING THE HEAD** right  
The knight's head was protected by a helmet. This particular type, a close helmet (p. 28), fits to the shape of the face and has connecting neck guard plates (known as gorget plates).



Leather strap and buckle for connecting breastplate to backplate

Vents for breathing

Lance-rest for stopping the lance sliding back when striking an opponent

Gorget plates to overlap with gorget

Strap for buckling skirt to tassets

Tassets made of articulated steel plates permitting freedom of movement at the waist

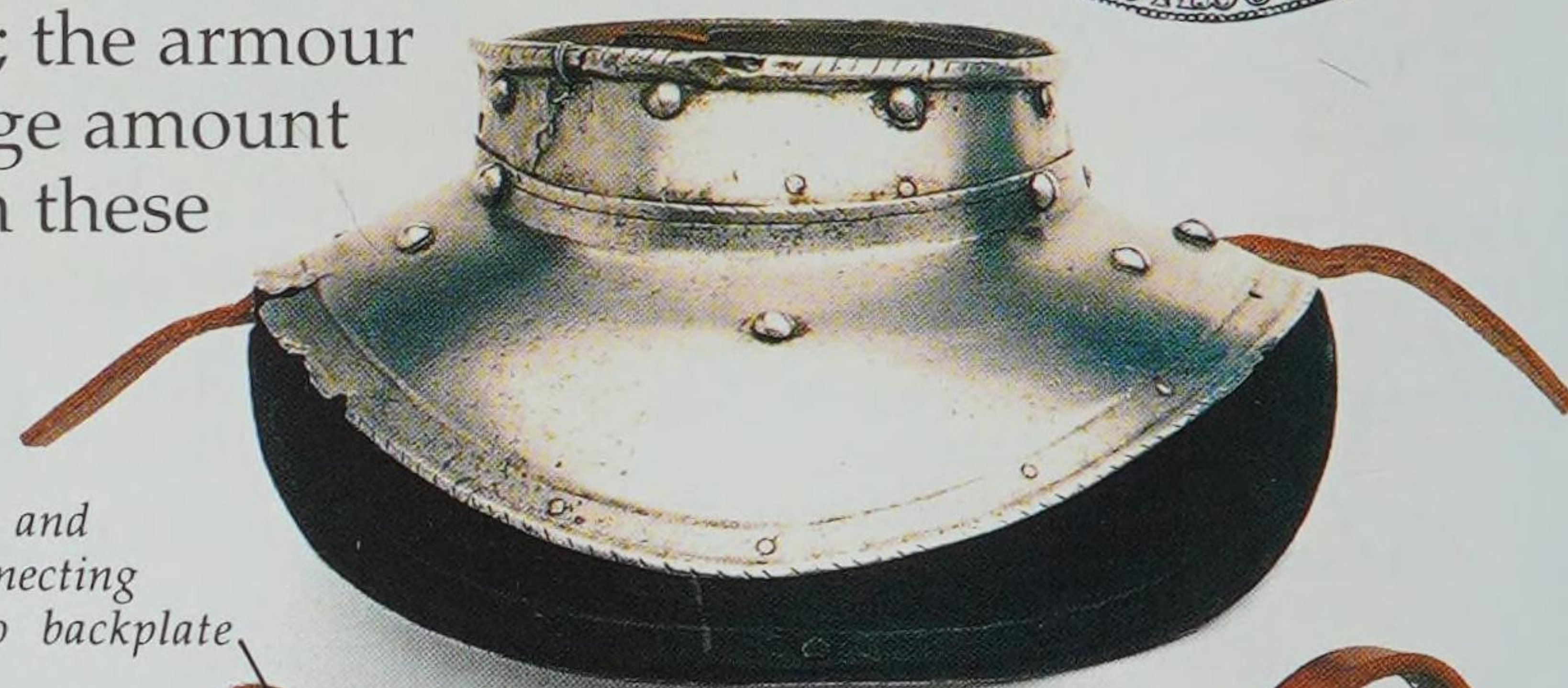
**ST GEORGE KILLING THE DRAGON** left

Some medieval illustrations of armour were romanticized and inaccurate, as here.

However, carefully illustrated manuscripts, brasses, and effigies are very important when looking for depictions of armour, especially for earlier periods when little survives.



13th-century seal of a king of Bohemia, showing the field armour typical of that period



**NECK DEFENCE**

Gorgetts (collar plates) became common in the 15th century.



**BREASTPLATE SECTION OF CUIRASS**

The cuirass, the armour that covered the torso, comprised a breastplate and a backplate connected to each other by straps. Extending from this breastplate are skirts and tassets - armour to protect the abdomen and upper thighs.



PAULDRON

### PIKEMAN'S ARMOUR

Armed with a pike, sword and buckler (shield), a 17th-century pikeman's only armour was a morion helmet (p.28) and a cuirass.



PAULDRON



COUTER

VAMBRACE

COUTER

POLEYN

CUISSE

POLEYN

VAMBRACE

**SHOULDER AND ARM**  
The shoulder defence was called a pauldron. The rest of the arm was protected by a vambrace, with the section covering the elbow called a couter.

**GERMAN KNIGHT, c. 1485**  
A fully armed knight mounted on a horse wearing full bard - the protective armour for a war-horse (pp. 30-31).



**SABATON** (for protecting foot - p. 25)

Hook for closing greave

MITTEN GAUNTLET

Thumb plate

MITTEN GAUNTLET (covered the hand - p. 25)

GREAVE

**LEG PROTECTION**  
A cuisse protected the upper part of the leg, a greave the lower part. The knee was covered by a series of plates called a poleyn.

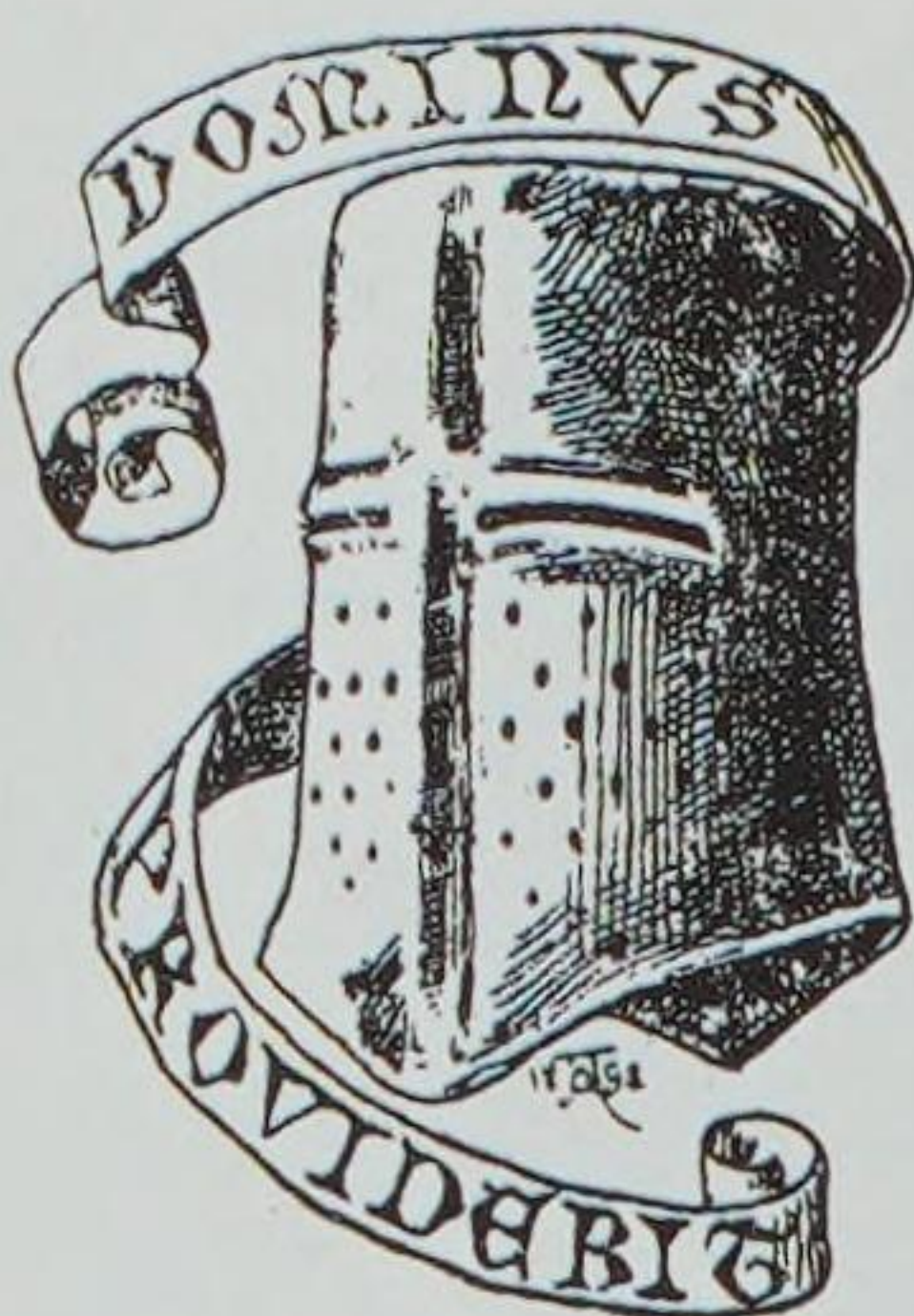
SABATON





# Helmets

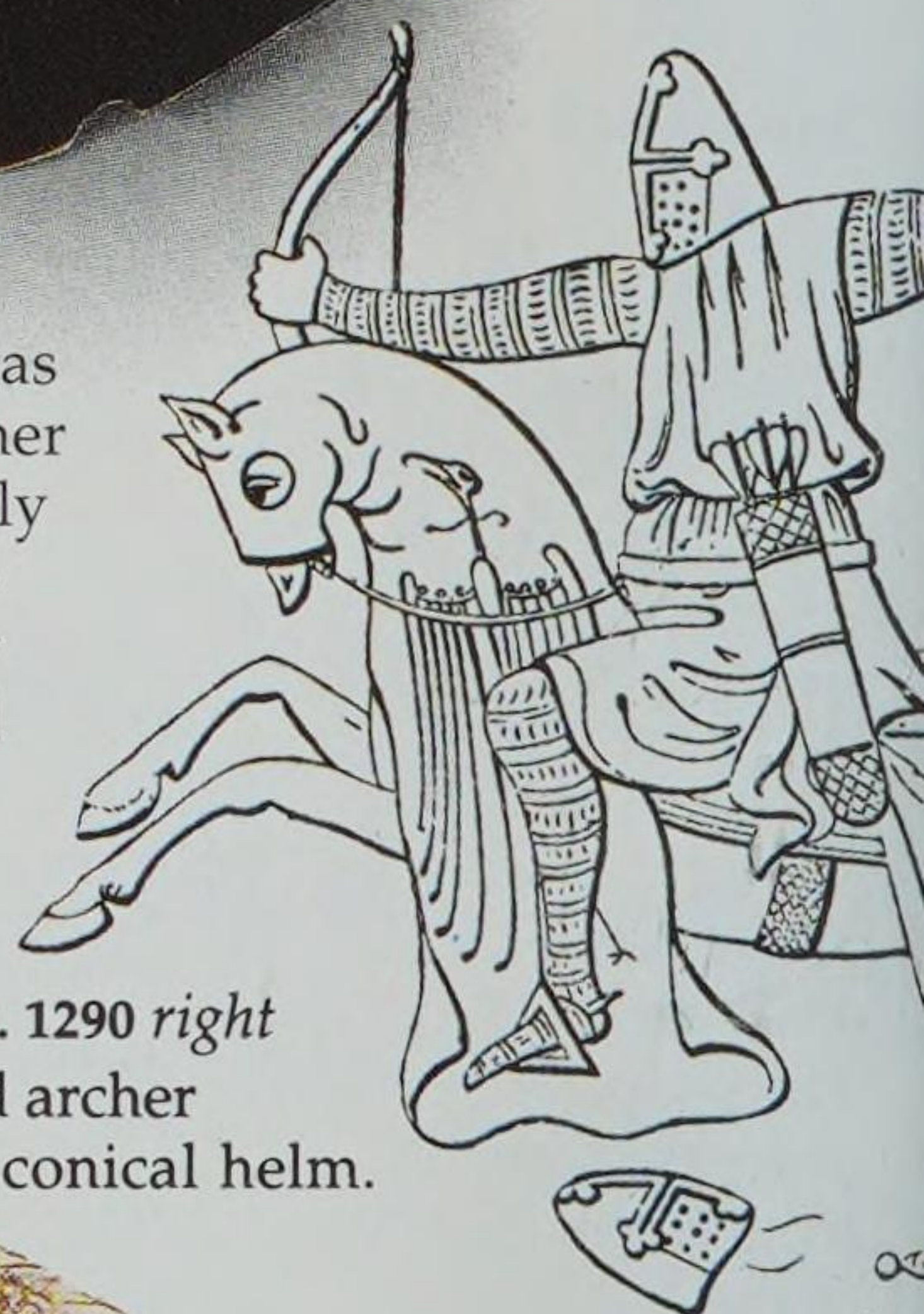
WARRIORS HAVE WORN protective helmets since the Bronze Age (pp. 10-11). But in the Middle Ages, helmets became considerably larger so as to give greater protection to the face and neck. The helm was the first all-enclosing helmet, padded inside for comfort, like all helmets, but rather hot to wear. The more open basinet, often with its own visor and mail neckguard, then became popular. From about 1400, a version with plate neck defences appeared but was rather cumbersome. It was gradually replaced by the side-opening helmet, then the front-opening close helmet. The open, wide-brimmed medieval kettle-hat developed into the morion in the 16th century and troopers' pots appeared in the 1600s.



13th-century helm with two eye slits and breathing holes

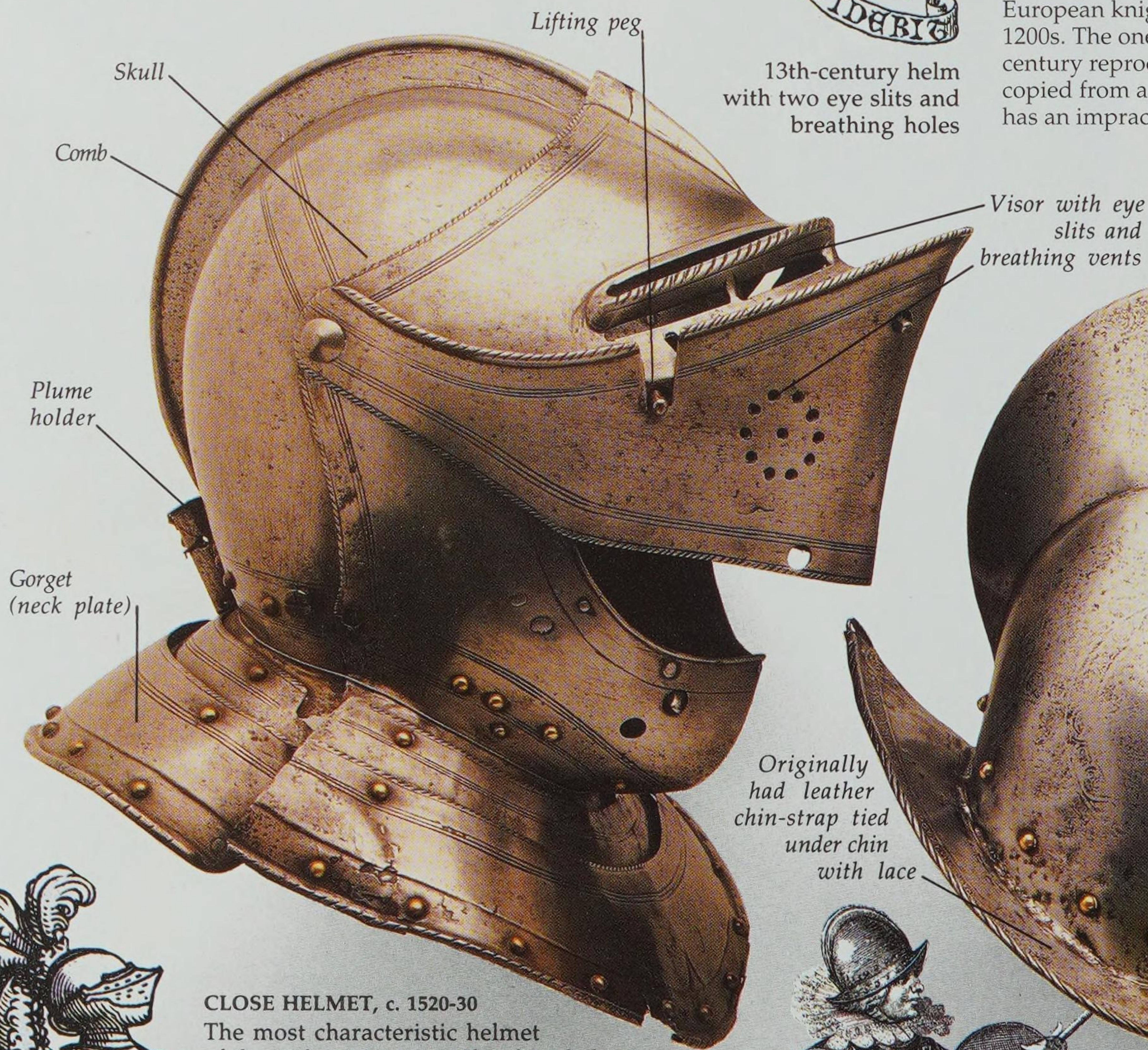
## FLAT-TOPPED HELM

The German *heaume* or helm was worn by the Crusaders and other European knights from the early 1200s. The one above is a 19th-century reproduction, possibly copied from a manuscript, and has an impractical shape.



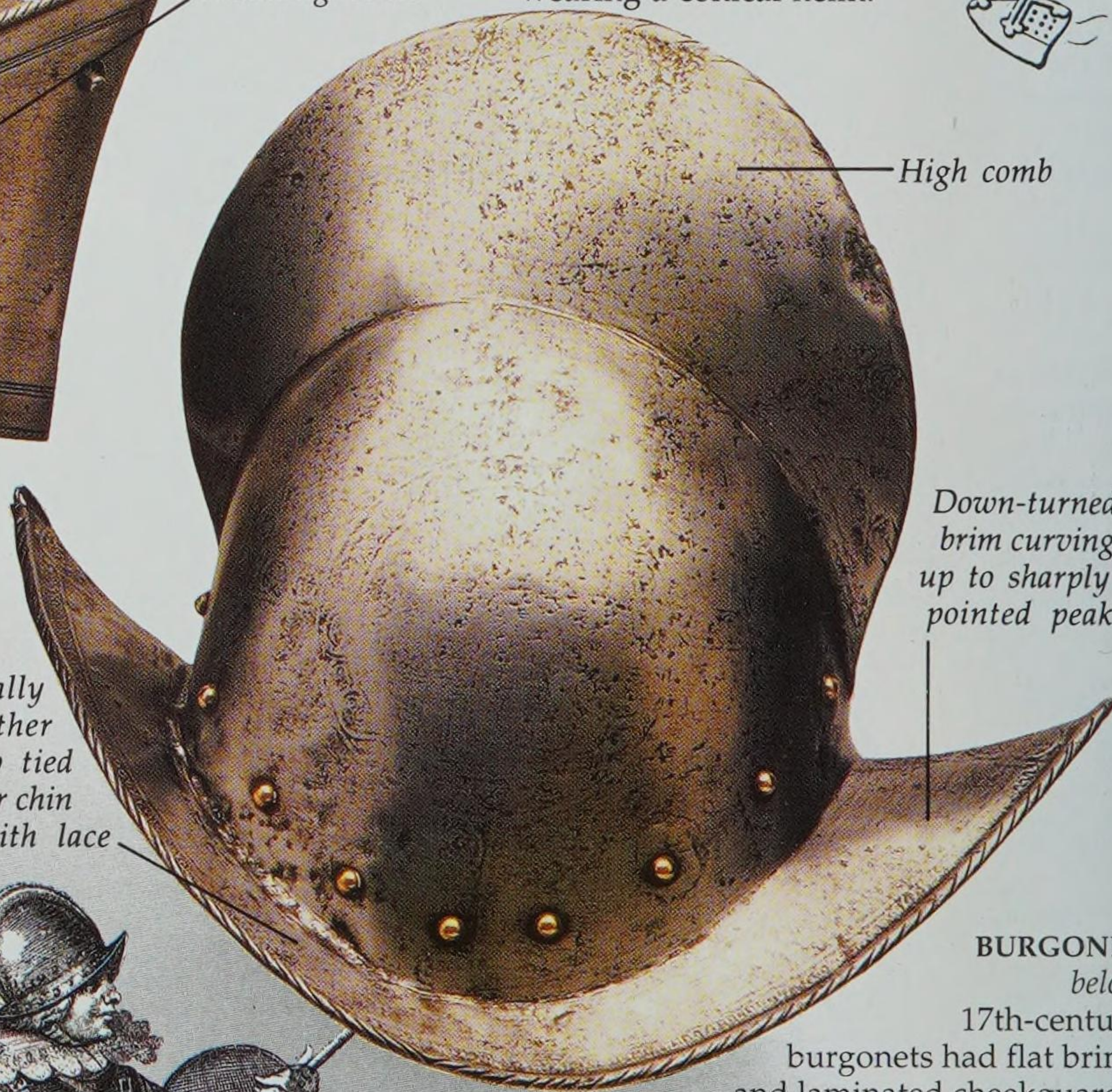
## ARCHER, c. 1290 right

A mounted archer wearing a conical helm.



## CLOSE HELMET, c. 1520-30

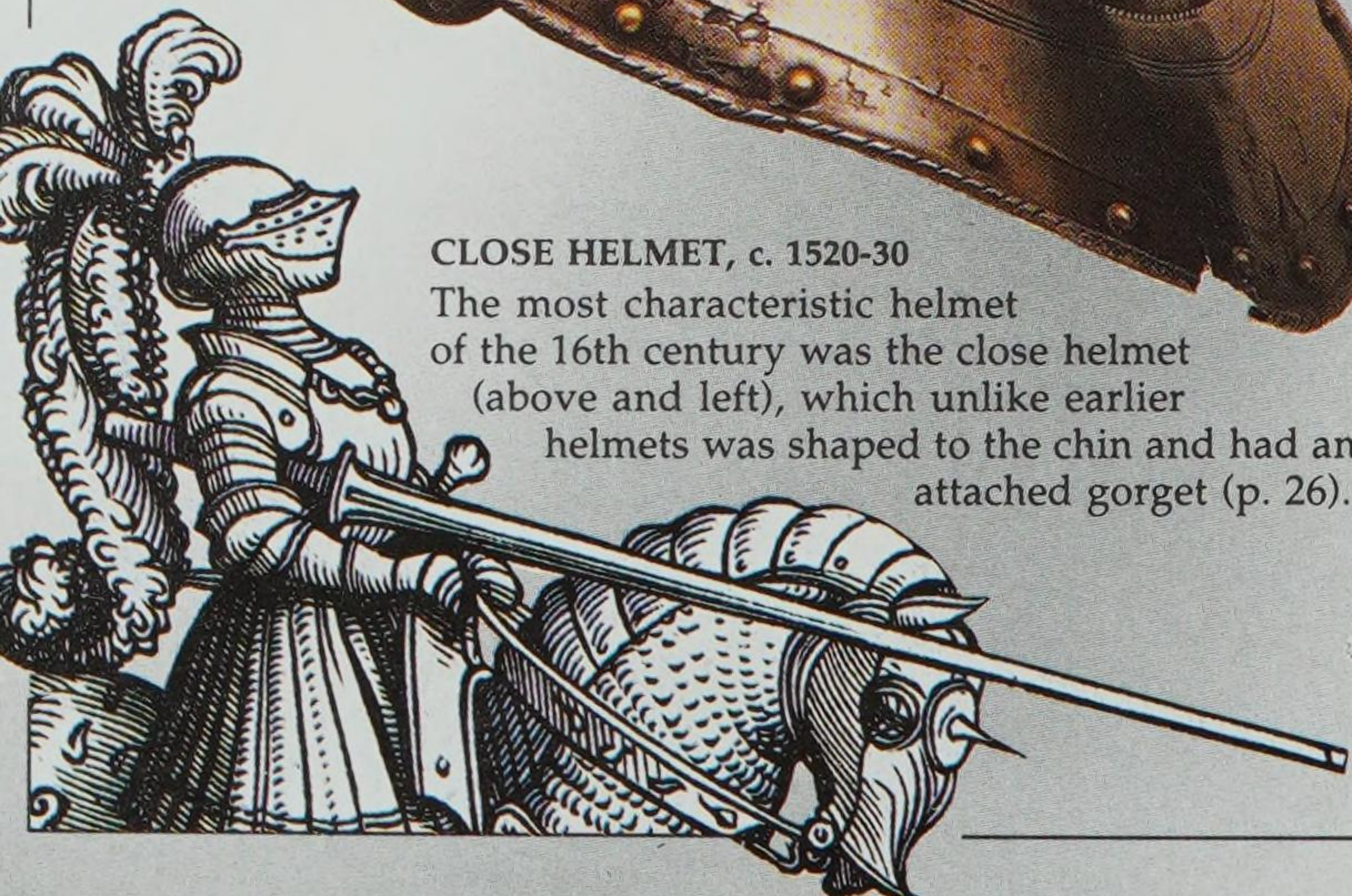
The most characteristic helmet of the 16th century was the close helmet (above and left), which unlike earlier helmets was shaped to the chin and had an attached gorget (p. 26).



## BURGONET

below

17th-century burgonets had flat brims and laminated cheekguards.

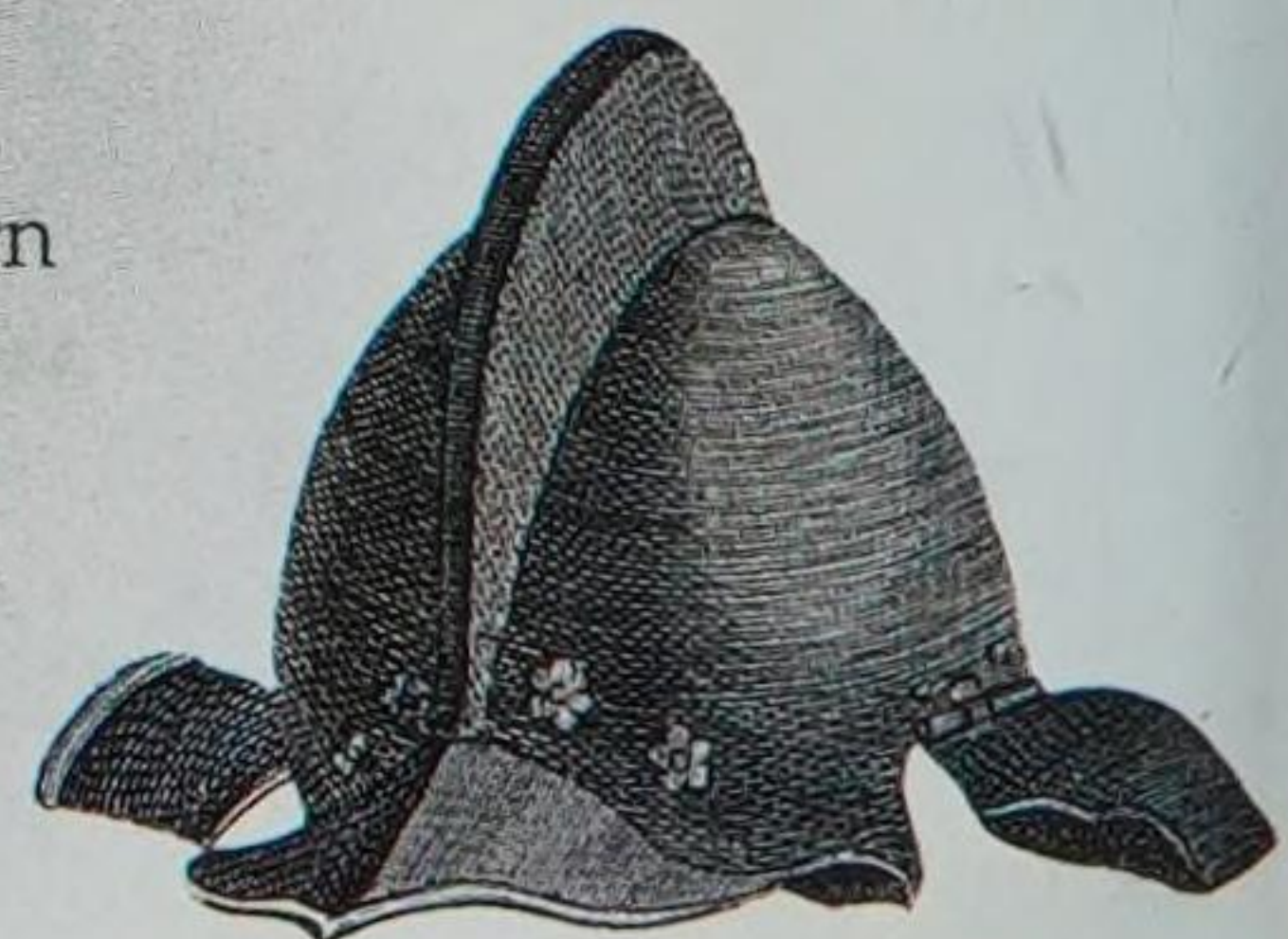


Originally had leather chin-strap tied under chin with lace



## COMB-MORION

A comb-morion was worn by pikemen (as left, but missing the cheekpieces) and musketeers, who found an open style of helmet more convenient when taking aim.





Three pieces of steel welded together

Eye slit

Breathing holes

Stud for attaching visor

#### CONICAL HELM, c. 1370

After the 1350s, the helm was mainly used for tilting (pp. 30-31). This (19th-century reproduction) late helm would probably have been worn on top of a basinet (right), placing an enormous weight on the knight's shoulders.

Guard-chain or safety chain - when helm not worn, it was often carried by chain

14th-century knights wearing visored basinets and a common soldier wearing a helmet called a kettle-hat (above)

#### BASINET

Between 1350-1450, the most popular type of helmet was the basinet. Visors (hinged plates for protecting the face) were introduced around 1300. In this great basinet of the early 15th century, plates (largely missing except at the neck) replaced the mail curtain.

Neckguard riveted to helmet's skull and partially shaped to neck

Cheek-pieces

Face guard formed of three vertical bars

#### LOBSTER-TAILED POT, c. 1630-50

A type of helmet worn in the mid-17th century originated in Germany, where it was called a *zischagge* (worn by the soldier on the right). It had a laminated neckguard and a sliding noseguard. The English version (shown above and left), was known as the English pot or "lobster-tailed pot". It had a faceguard, neckguard and hinged cheekpieces.

Sliding nasal bar

17th-century musketeer wearing ordinary civilian hat

#### IRON HAT, c. 1640-50

An unusual helmet is this high-crowned iron hat with a sliding nasal bar, occasionally worn by horsemen during the English Civil War. Originally covered in material and with a plume, it looked like a civilian hat of the time.

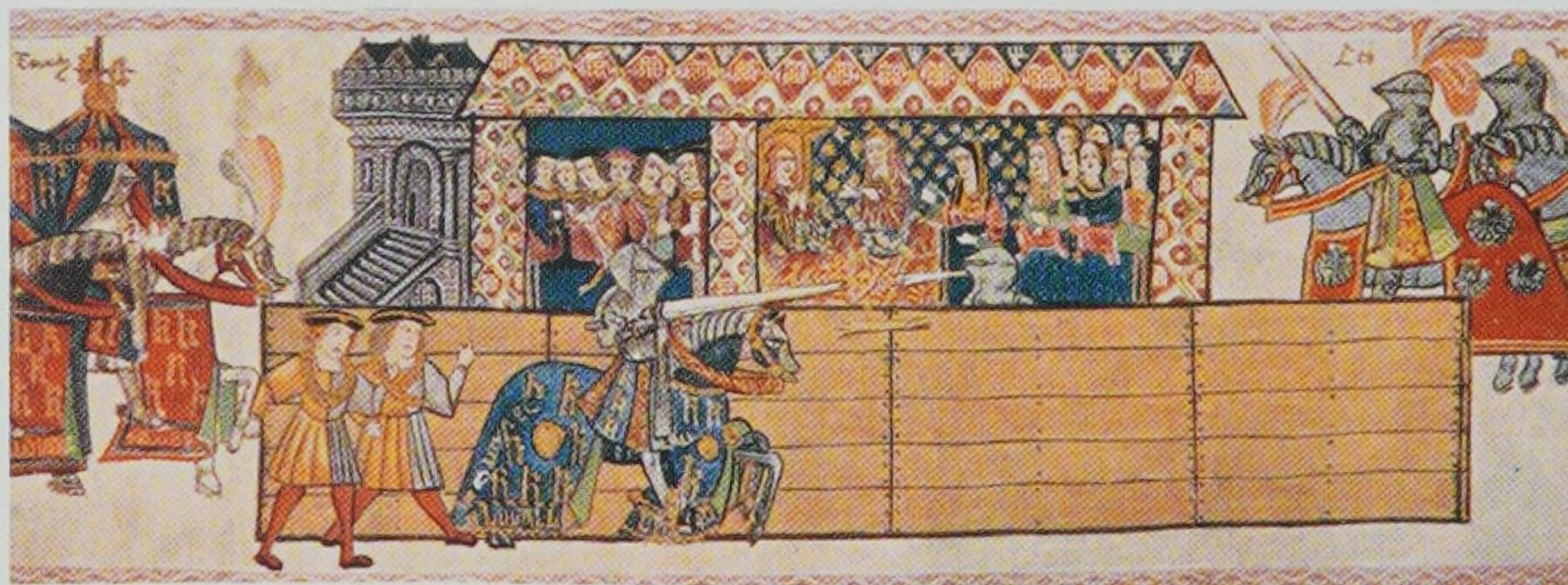


# Tilting armour



THE EARLIEST TOURNAMENTS - mock battles between mounted knights - probably began in the 1100s as a form of rehearsal for war. But by the 1400s, tournaments had evolved into important and colourful social events at which knights displayed their fighting skills and courage before their monarch and their peers. In the 13th century, jousts appeared in which two mounted knights charged each other with lances. From about 1430, a barrier (called a tilt) was used, hence the word "tilting". Special armour was made for knights taking part in this and other forms of contest to protect the left (or target) side of the body.

**COATS OF ARMS**  
Tournament contestants were identified by the personal insignia displayed on their shields and tunics. Originally shown on the surcoats worn over mail, the insignia became known as "coats of arms".



A French knight tilting with a lance

**PARADE HELMET, c. 1630** *left*

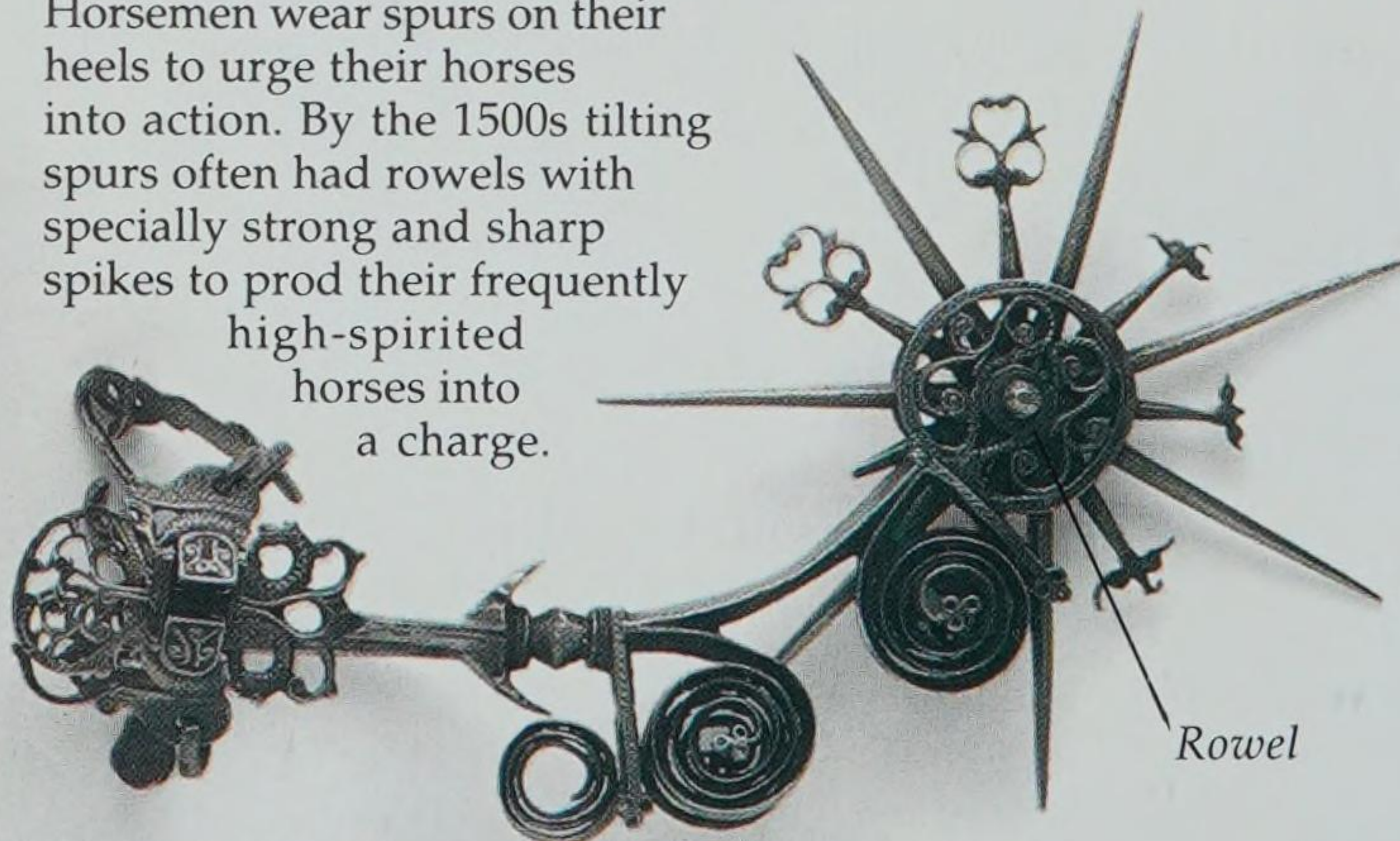
This bronze helmet with its grotesque human face mask was probably used for the parades that took place in 17th-century tournaments, which had become chiefly displays of horsemanship.

**A JOUSTING CONTEST** *above*

By the 16th century, tournaments were accompanied by much formal pageantry. The field, or lists, was enclosed by barriers and overlooked by pavilions where royalty and other notables could watch. This depiction of a tournament shows King Henry VIII tilting with one of his knights, watched by his queen.

**TILTING SPUR** *below*

Horsemen wear spurs on their heels to urge their horses into action. By the 1500s tilting spurs often had rowels with specially strong and sharp spikes to prod their frequently high-spirited horses into a charge.

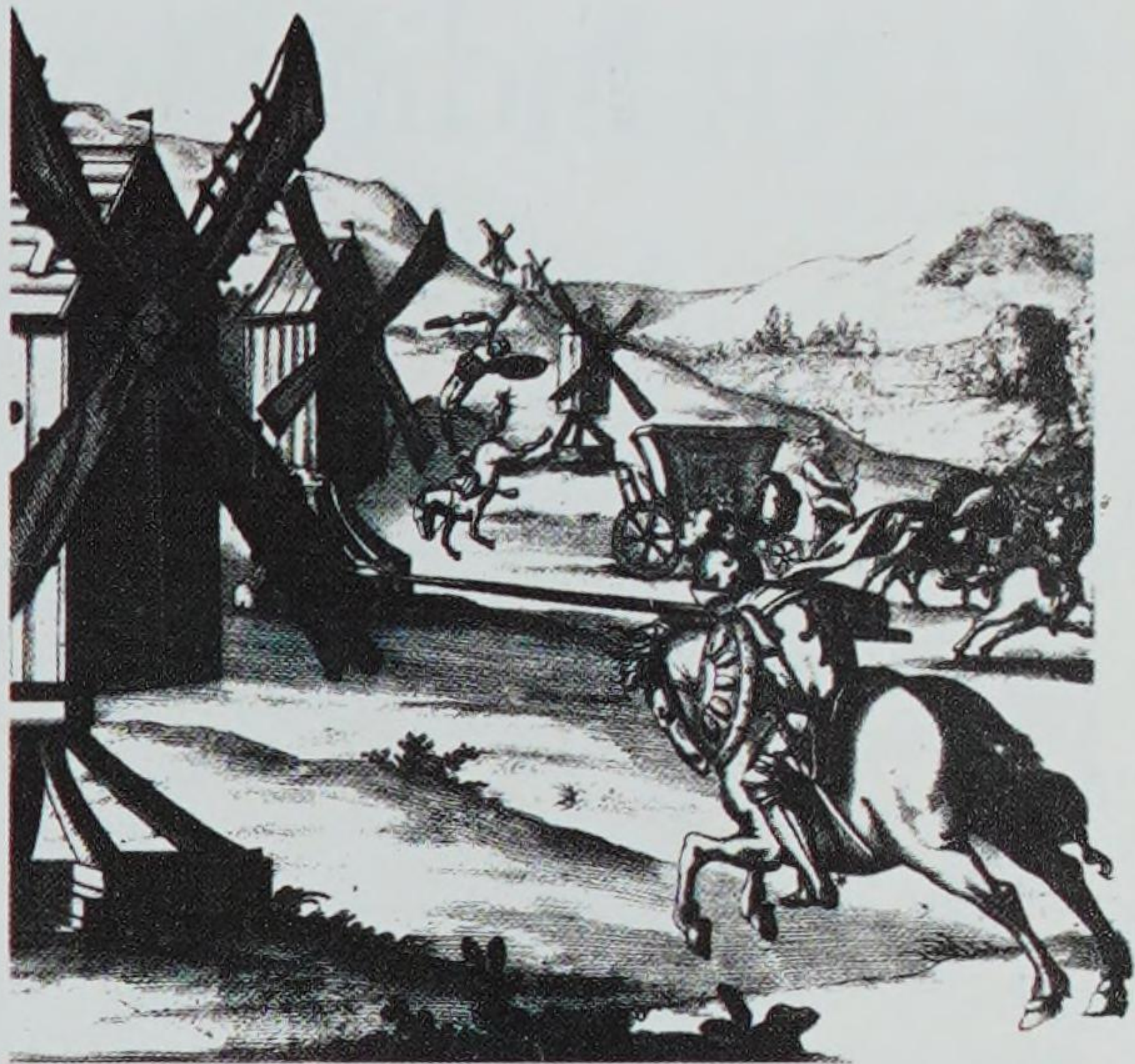


Rowel



**HORSE ARMOUR** *below*  
In a tournament, when jousting, a horse often wore a great padded buffer over its chest under the cloth caparison, or even metal armour. The shaffron - a series of metal plates - protected its forehead and face. Some shaffrons had a spiked shield projecting from the centre.

**DON QUIXOTE TILTING AT WINDMILLS**  
In the novel *Don Quixote* an old knight's belief in the chivalric romances he has read leads him into a series of unusual adventures. During his travels Don Quixote tilts at windmills, imagining them to be giants.



**PROTECTING THE FACE, CHEST AND ARM**  
Added protection to the knight's face, neck and chest was provided by a heavy plate called a grandguard and to his left arm by another plate called a pasguard.

16TH-CENTURY SHAFFRON

GRANDGUARD

Threaded hole for attaching jousting armour to field armour

Bolt for attaching grandguard to field armour underneath

ITALIAN TILTING ARMOUR, c. 1540

Bolt for attaching pasguard to armour underneath

PASGUARD

Shaffron with spiked shield

**RIGID ARMOUR**  
The armour pictured here is for jousting with a lance and was designed to bolt on and keep the knight rigid when hit. Occasionally, after the lances broke, contestants would carry on fighting with other weapons, first removing the reinforcing pieces of rigid plate armour.

**PROTECTING THE LEFT HAND**  
The manifer (from the French *main de fer* "iron hand") was a reinforcing section that protected the left gauntlet - armour covering the hand that held the shield or secondary weapon.

MANIFER

Wooden tilting lance



# An Indian warrior

FOR MANY CENTURIES the Persians were the supreme craftsmen of Asia, and oriental arms and armour were dominated by Persian styles and workmanship. In the 16th century, Mogul invaders introduced a Persian-style of body armour and weapons to India. Although the Indians had already developed a kind of shield (as seen in early Indian art) and although some Indian weapons, such as the matchlock musket, were derived from European firearms, the arms and armour of the north Indian warrior shown on

these pages were remarkably similar to that of a Persian or Turkish warrior.

19th-century engraving of a scimitar



**MOGUL BATTLE SCENE** below  
The Moguls were Muslim warriors who founded a great empire in India, which lasted from the 16th to the 19th century. In this 17th-century Mogul miniature, the warriors are wearing characteristic north Indian armour and weapons.

Watered steel blade

## LIGHTWEIGHT SABRE right

The *shamshir*, a light sabre, is a classic Indian sword. Originating in Persia, the weapon then spread to India, and eventually to Europe, where the type became known as the scimitar.

**RECURVED DAGGER**  
This type of Indian dagger, known as a *khanjar*, has a slightly recurved double-edged blade. The handle is made entirely of steel.

Double-edged, watered steel blade

Sling hoops in decorated enamel

Velvet lining

## FIGHTING AXE

A popular weapon among Indian warriors was the *tabar*, an all-steel axe (pp. 34-35). This particular type of *tabar* has a sharp pick opposite a crescent-shaped blade.



**CIRCULAR STEEL SHIELD** *below*  
By the 18th century, Indian and Persian soldiers used a round shield (*dhal* or *sipar*) made of steel or hide (pp. 34-35). Four bosses covered the attachment of the handles for carrying the shield on the left arm.



Made of watered steel with chiselled and gilded decoration, north Indian, c. 19th century



**INDIAN WARRIORS**  
Photograph, taken in 1857, of Rajput warriors. They are armed with a *dhal*, *tulwar* and a *bandukh toradar* (matchlock musket).

Spike socket  
(spike missing)

**NORTH INDIAN HELMET**  
Known as a *top*, this Indian helmet had mail curtains called *aventails* descending to the shoulders. The helmet was secured under the chin with a braid tie.

Socket for feather or tinsel plume (plume missing)

Sliding nasal bar for protecting nose

Aventail to protect the neck, shoulders and part of the face

Mail shoulder straps with metal clasps



**ARM GUARD** *below*  
The tubular vambrace or *dastana* was fastened to the arm with straps. The mail extension is to protect the hand.

**RECTANGULAR BREASTPLATE** *right*  
The Indian cuirass, known as a *char aina* (Persian for "four mirrors"), consisted of a light breastplate, a backplate and two side plates, all of which were shaped to fit on top of the warrior's mail shirt.



Wooden shamshir scabbard bound in tooled leather

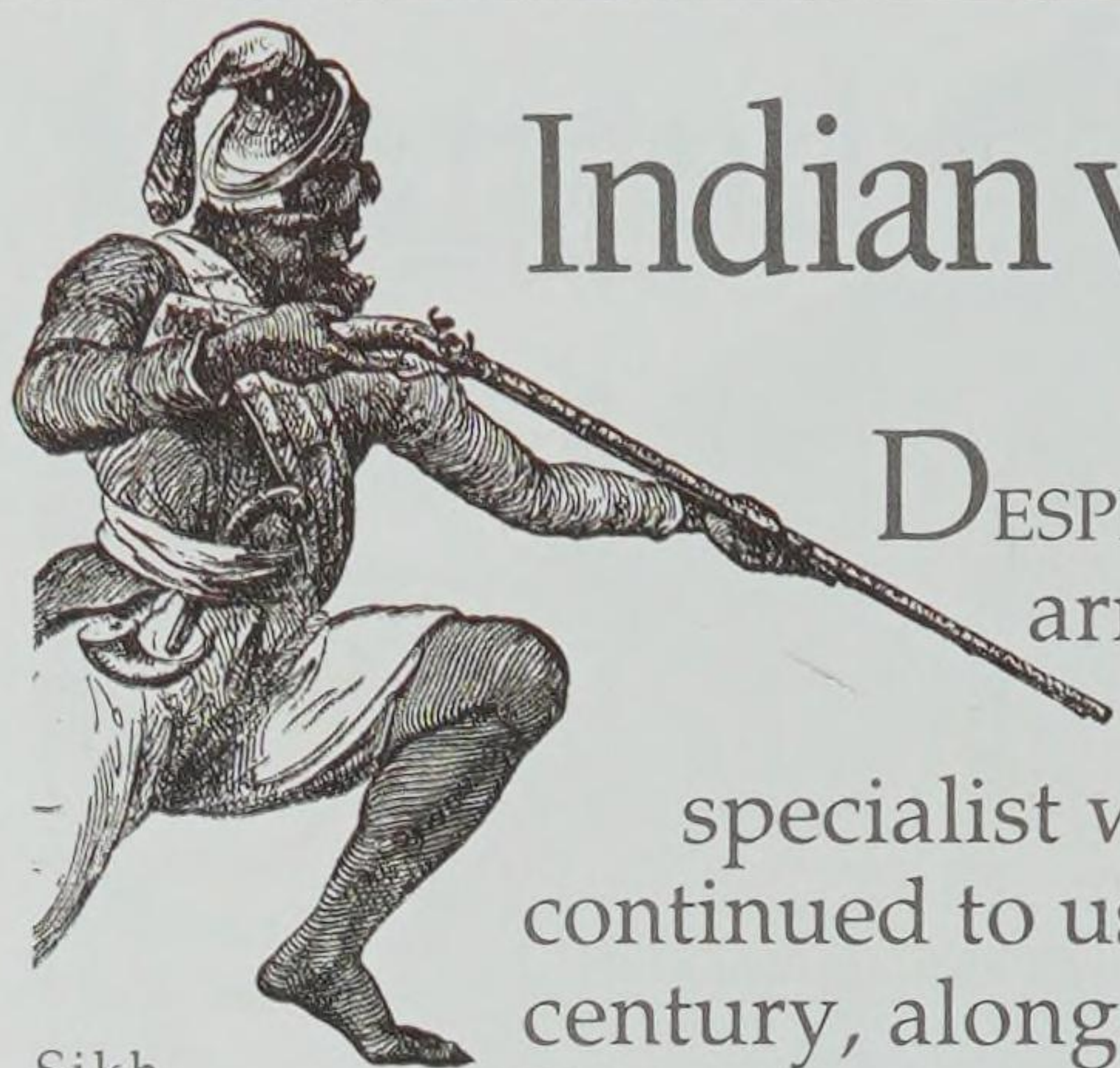
Decorated in gold and silver false damascene

Lined gold damascened trellis pattern



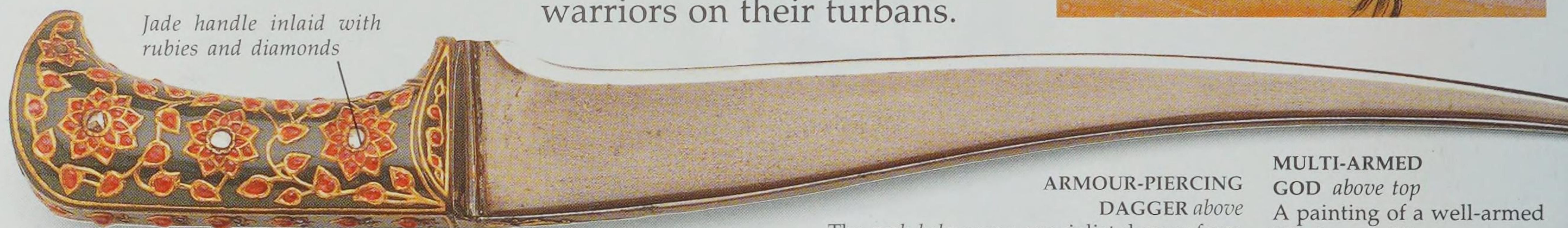


# Indian weapons



Sikh soldier using a matchlock musket, c. 1846

DESPITE THE FOREIGN INFLUENCE on Indian arms and armour (pp. 32-33), some Indian states and peoples developed specialist weapons of their own which they continued to use up until the beginning of the 20th century, alongside Indo-Persian swords and European-style muskets. These characteristic and often beautifully decorated weapons include the *katar*, the Hindu thrusting dagger, and the *chakram*, the steel war quoit worn by Sikh warriors on their turbans.



Jade handle inlaid with rubies and diamonds

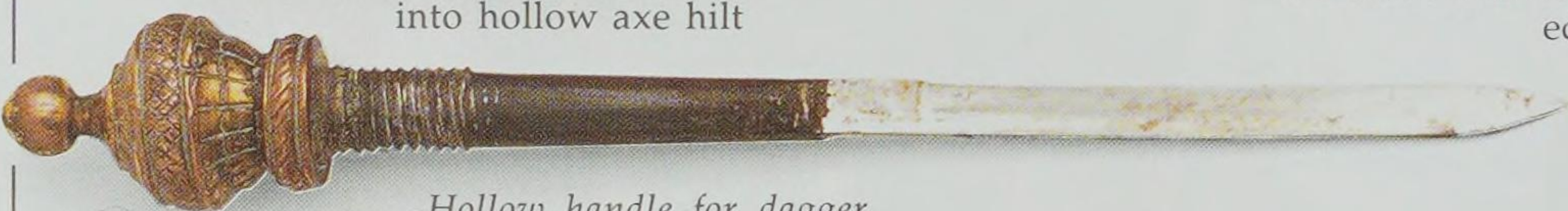
ARMOUR-PIERCING DAGGER above

The *pesh-kabz* was a specialist dagger from Persia and north India, used mainly for piercing mail. The blade was wide at the hilt, narrowing to a cutting edge before tapering to a sharp point.

MULTI-ARMED GOD above top

A painting of a well-armed Hindu god. His weapons include an axe, thrusting dagger, tridents, swords, mace, and a spear.

Dagger that screws into hollow axe hilt



Hollow handle for dagger



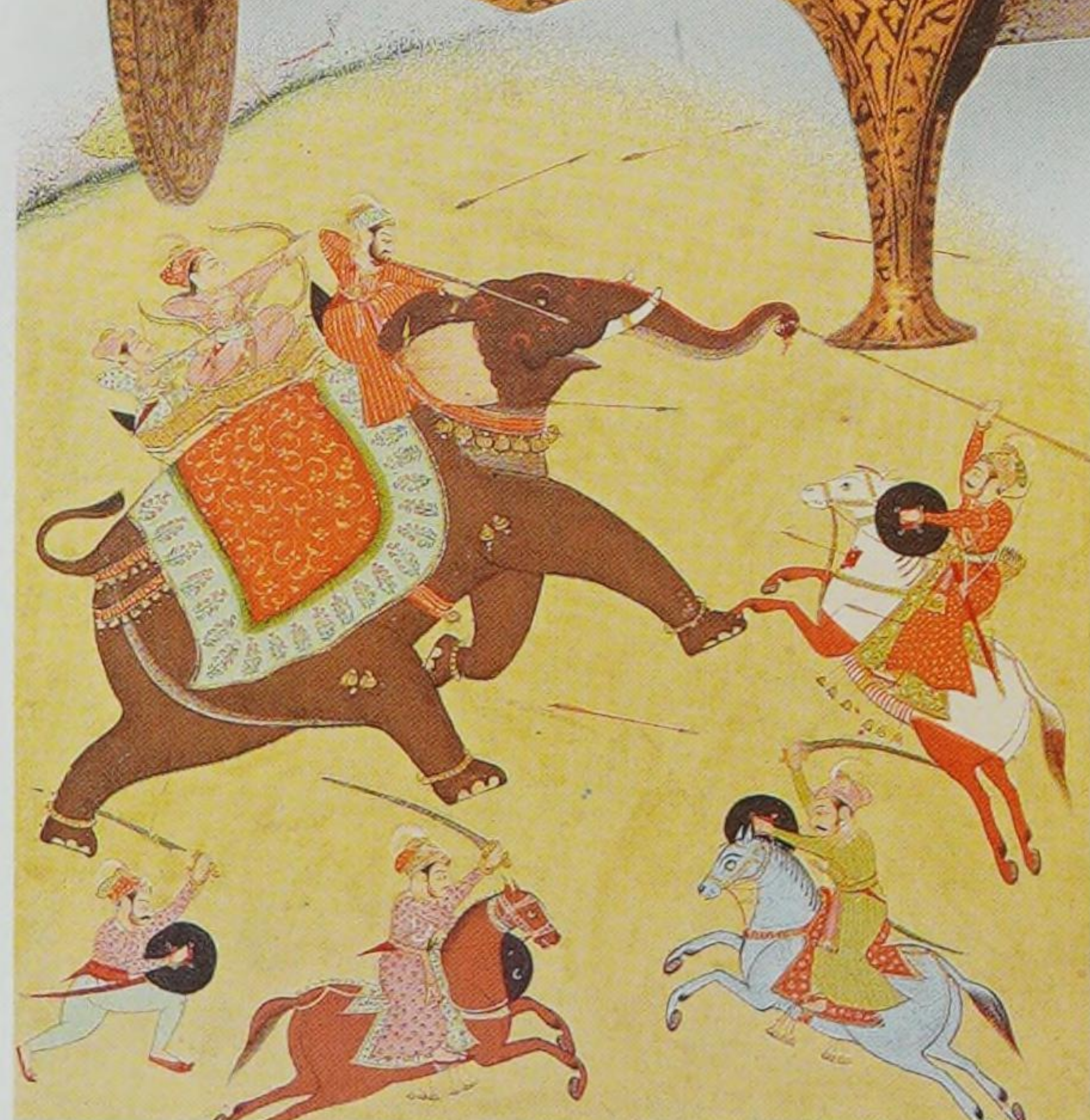
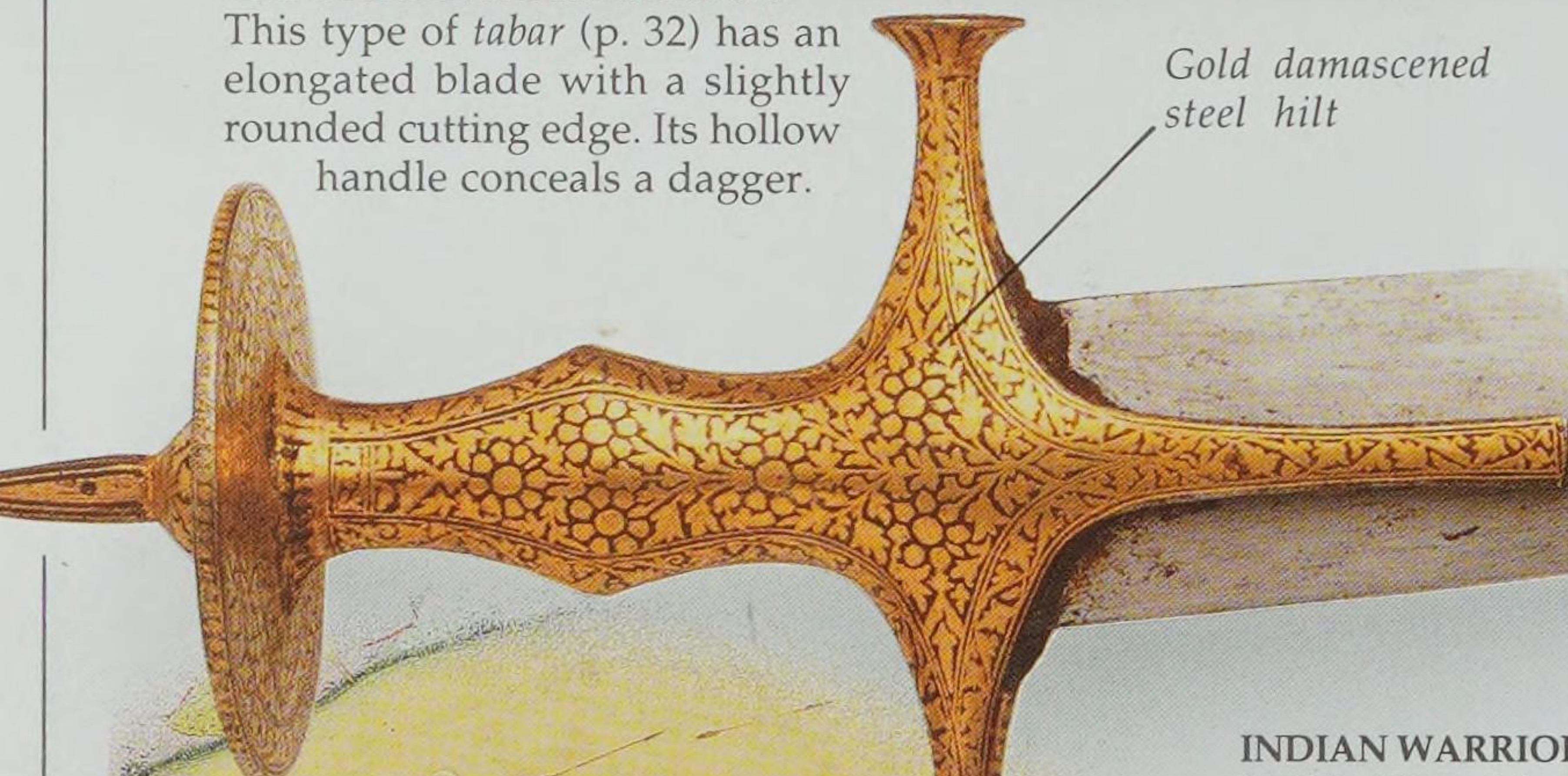
ALL-STEEL BATTLE-AXE above

This type of *tabar* (p. 32) has an elongated blade with a slightly rounded cutting edge. Its hollow handle conceals a dagger.

Gold damascened steel hilt

SINGLE-EDGED SWORD below

The *tulwar* was a curved sword widely popular in India. This one has the short grip and dish-like pommel characteristic of the Punjab region.



INDIAN WARRIORS IN BATTLE left

In this Mogul (p. 32) battle scene every combatant carries a *katar* or thrusting dagger. There is also the type of Indian sword, the *tulwar*, and some soldiers are carrying the shield known as a *dhal*. Other weapons being used are a bow and arrows, a spear and a musket.





Made  
of carved  
wood



Hindu god

**MATCHLOCK POWDER FLASK**  
Matchlock muskets, *bandukh toradars*, were used in certain parts of India until the early 20th century. This painted and gilded matchlock powder flask, carved in the shape of a fish, has a Hindu goddess coming out of its mouth.

**WAR QUOIT**  
Used mostly by the Sikhs of north-west India, the *chakram* is a flat steel quoit with a razor-sharp outer edge. Several quoits were worn around a tall, conical turban and were either whirled around the forefinger before throwing or held between the thumb and forefinger and thrown underarm.

Sharpened  
outer edge

Rounded inner edge

Rounded  
cutting edge



Inlaid with  
silver and gilt

Square  
hammerhead

Single-edged  
curved blade

Sikh soldier  
spinning a *chakram*  
round his forefinger



Large  
double-edged  
blade

**THRUSTING DAGGER right**  
The Hindu dagger, the *katar*, is only found in India. Made entirely of steel, the weapon has an H-shaped handle which is gripped in the fist and used at close quarters in a punching action.



**HIDE SHIELD left**  
This type of *dhal* (pp. 32-33) is made of hide and is decorated with paintings of Hindu gods.



Metal strips  
protecting  
wrist

Two parallel bars  
form grip





# A Japanese samurai



A *tsuba* (or sword guard)

JAPANESE WEAPONS and armour are quite unique. Developed over many centuries, the armour is highly decorative, especially the ornamental type worn by the aristocratic warriors known as *samurai* (Japanese for "guard"), whose code of honour dominated Japanese military life from the 12th century until 1868, when the *samurai* class was abolished. Japanese arms are equally well constructed, especially the swords, which without doubt, are the finest ever made.

A *wakizashi* scabbard (a *saya*), made of lacquered wood (below)



Wooden sheath for spear head

Metal collar to protect point of junction in a decorative manner

Ornamentation with mosaic design made of mother of pearl

Blade made by covering a soft iron core with layers of steel

Flecked lacquer sheath

Lacquered hilt

Known as *tsuba*, Japanese sword guards are collectors' items (above left)

Hilt made of wood covered with fish skin and bound with flat braid

**DAGGER** above  
An example of the typical Japanese dagger (the *tanto*) with its single-edged blade.

**SPEAR** left  
Short-bladed spears (*yari*) were carried by horsemen. Foot soldiers carried longer-bladed *yari* (see right).

**SHORT SWORD** left  
A samurai carried both a short and a long sword. This 17th-century sword is a *wakizashi*, a short sword used not only as an additional fighting sword, but also for the ritual suicide, *seppuku*.

Large crayfish design in black lacquer

Silken cord for securing sword to girdle

Kabuto helmet with horn-shaped crest



**FOOT SOLDIER** above  
This 19th-century foot soldier is wearing a light cuirass (p. 26) or *haramaki*. Designed mainly for foot soldiers, the *haramaki* covered the soldier's breast and sides with additional skirts (the *kasazuri*) protecting his lower torso.

**SCABBARD FITTINGS**  
A small knife known as the *kozuka* (left) and a skewer, the *kogai* (far left), were carried either side of the *tanto* (dagger) and sword scabbards.

Hand guard or half-gauntlet, with leather lining and loops for fingers





**A SAMURAI COMBAT** *left*  
This early 19th-century print shows a sword fight between two *samurai* fighting with *katana*, long fighting swords. Their secondary swords, *wakizashi*, are tucked through the girdles around their waists.

Wings or protective flaps known as the *fukigayeshi*

Decorated with brass and lacquer

The *maidate* - the socket for the helmet crest

Cord for attaching mask to helmet



*Hempen* moustache

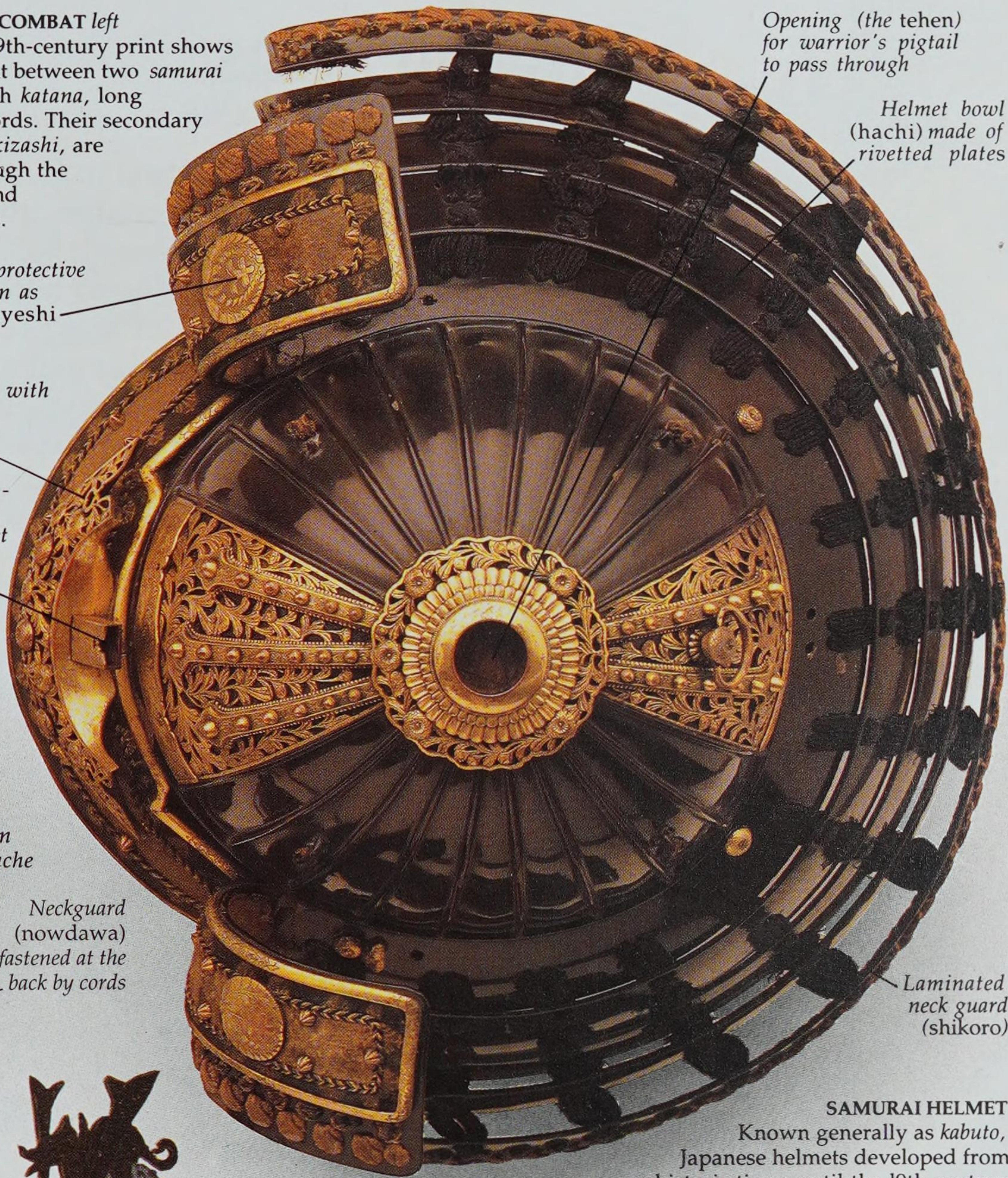
Neckguard (*nowdawa*) fastened at the back by cords

**WAR MASK** *above*  
Warriors wore different types of war mask or *mempo*, such as this half-mask with a nose-piece. Masks not only secured the helmet firmly to the head, they also gave the wearer a more frightening appearance.

Made of silk overlaid with mail connecting metal plates



Japanese general wearing a *kabuto* helmet with a helmet crest or *kashira-date*.



Opening (the *tehen*) for warrior's pigtail to pass through

Helmet bowl (*hachi*) made of rivetted plates

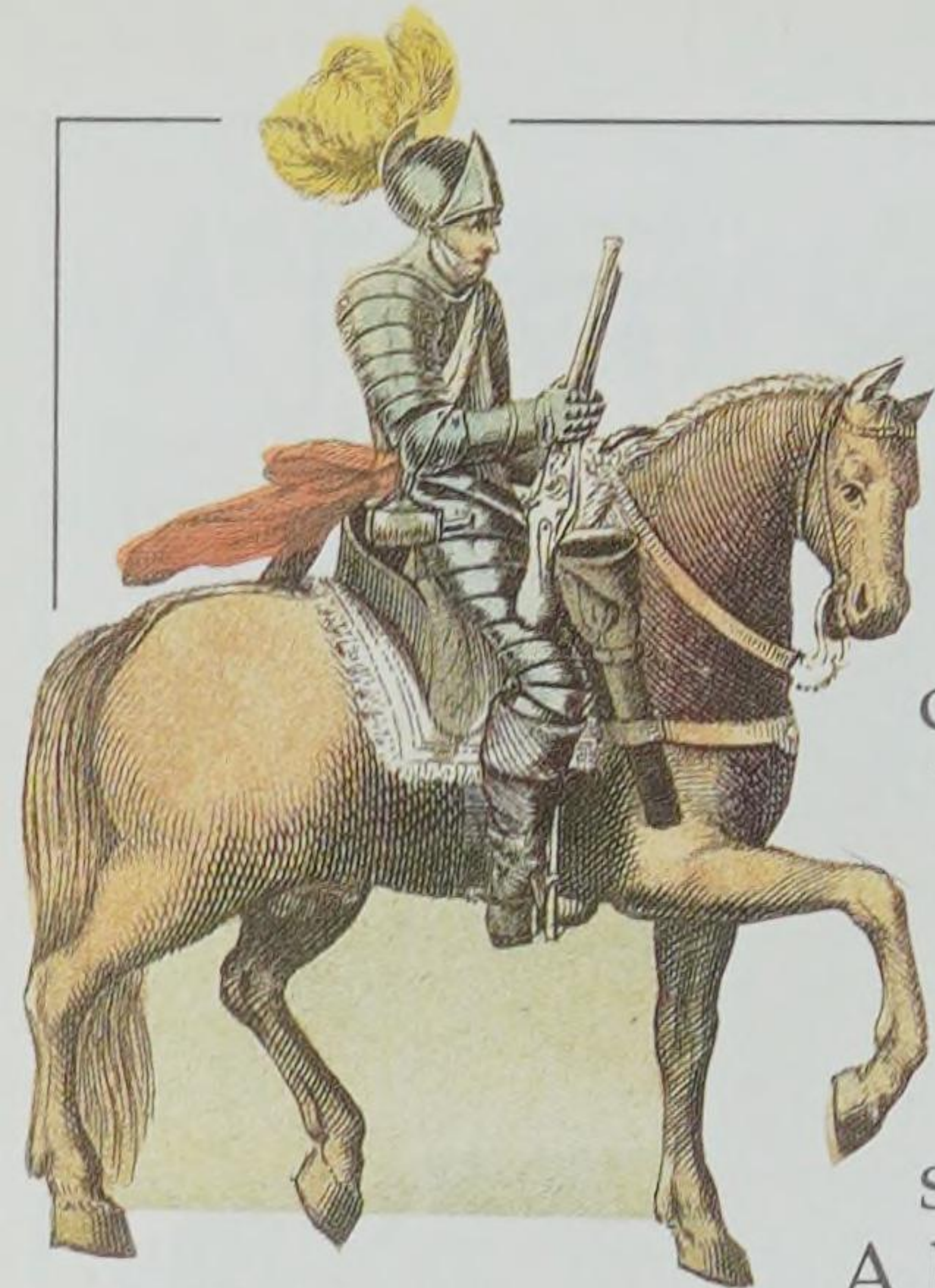
Laminated neck guard (*shikoro*)

**SAMURAI HELMET**  
Known generally as *kabuto*, Japanese helmets developed from prehistoric times until the 19th century with each period having its own distinct features and design. The *kabuto* was secured to the head with cords attached to the brim.

**ARMoured SLEEVE** *below*  
A type of vambrace (p. 27), the armoured sleeve (*kote*) protected the arm from spears and swords. Made of close-fitting material, it was laced over the arm and tied around the chest.







**HEAVY CAVALRYMAN**  
Wheel-lock pistols were the first small arms carried by cavalymen.

# Early firearms

ALTHOUGH GUNPOWDER was used in Europe in the 14th century, it was not until the 16th century that small arms began to fulfil their potential. Wooden stocks now helped the firer to aim, absorb the recoil and hold the hot barrel; an ignition mechanism or lock let him fire at just the right moment. The simple matchlock plunged a smouldering slow-match into the priming pan at the touch of a trigger.

A later form of ignition, the wheel-lock, went one stage further, by generating sparks at the moment of firing.

As it was too expensive to replace the matchlock entirely for the common

soldier, both these systems were used until they were replaced by the more efficient flintlock (pp. 40-41).



**LOADING SEQUENCE**  
Early muzzle-loaders may appear simple, but they had to be loaded in strict sequence to prevent misfiring or personal injury. On the left are a few of the loading and firing actions taught to soldiers using these early firearms.

"March, and with your Musket carry your rest"

"Poise your Musket"

"Shorten your scouring stick"

"Try your Match"

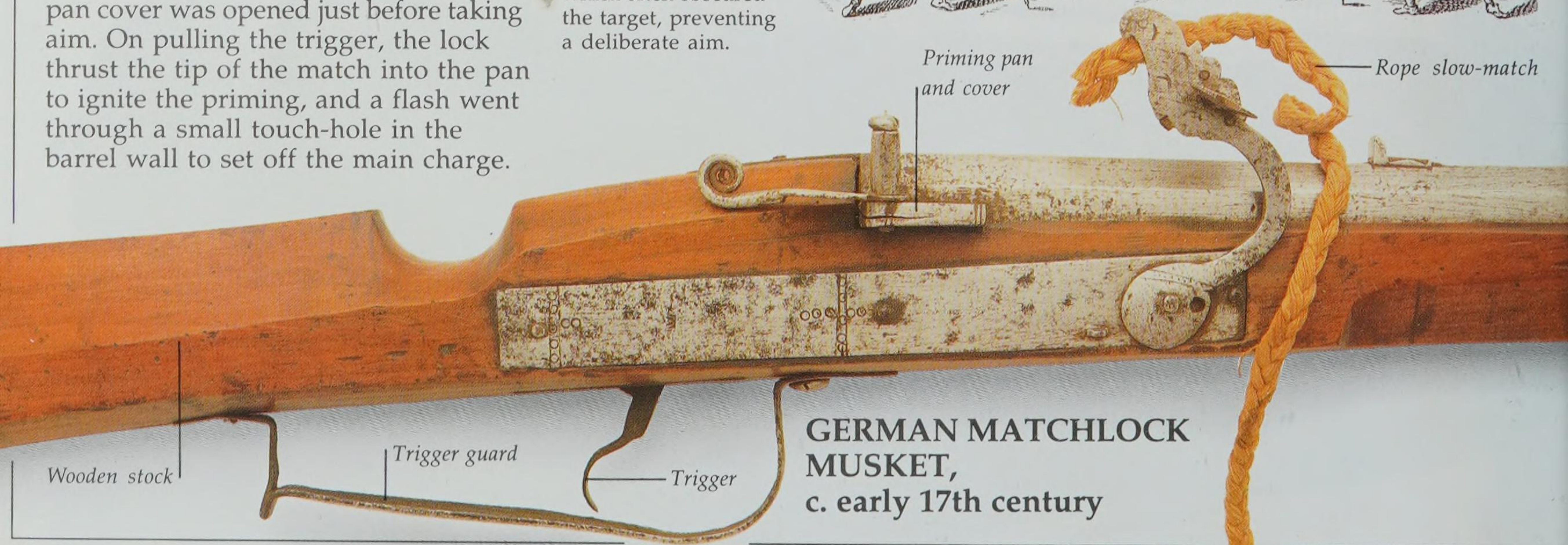
"Give Fire"

## The matchlock

This matchlock is a typical infantry musket of the early 17th century. The pan cover was opened just before taking aim. On pulling the trigger, the lock thrust the tip of the match into the pan to ignite the priming, and a flash went through a small touch-hole in the barrel wall to set off the main charge.

### OBSCURING THE TARGET

One disadvantage of the original black gunpowder was the dense white smoke it produced, which often obscured the target, preventing a deliberate aim.

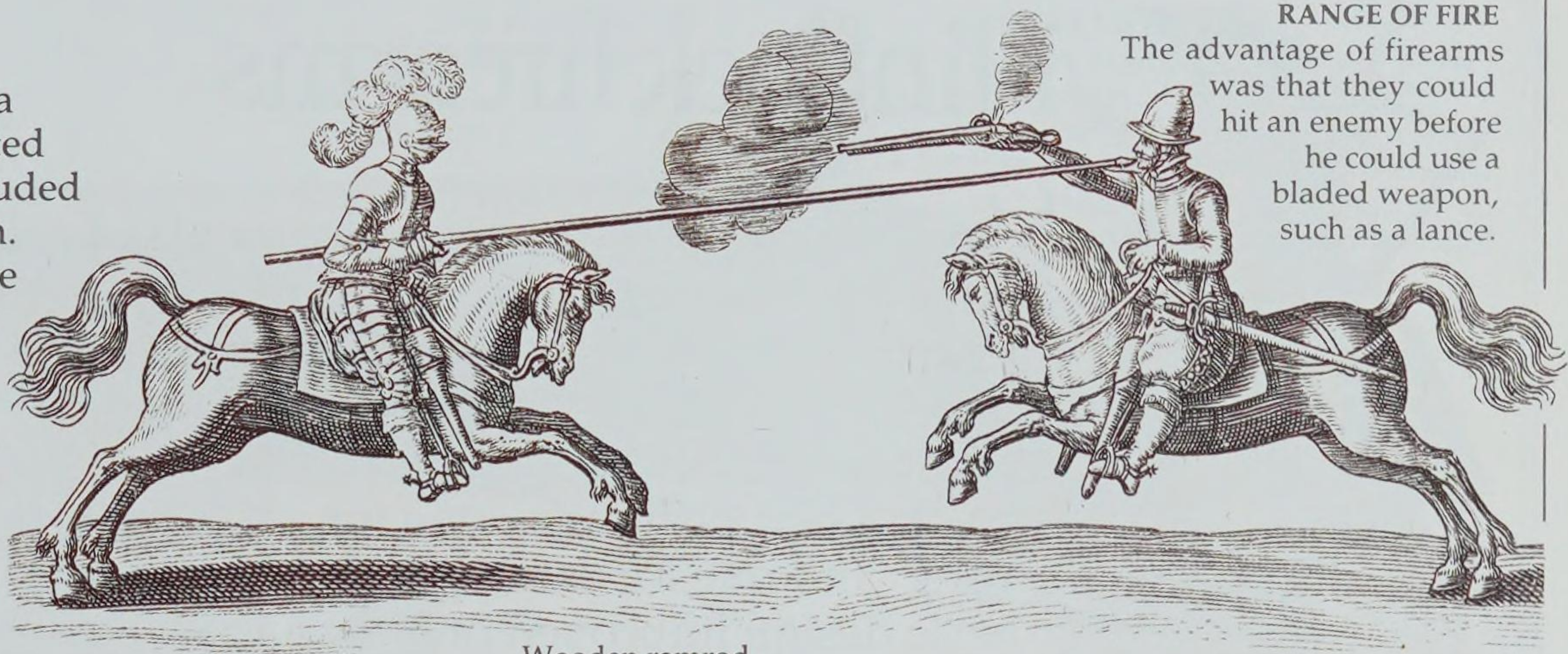


**GERMAN MATCHLOCK MUSKET,**  
c. early 17th century



# The wheel-lock

This lock produced sparks by holding a piece of iron pyrites against the serrated edge of a spinning wheel, which protruded through the bottom of the priming pan. Just below the pan was a square spindle on which a key was fitted. As the key was turned a short chain attached to the mainspring caused it to wind up. After the "dog" or cock was lowered into the pan, the wheel was released, spinning against the pyrites and showering sparks into the pan, setting off the priming and main charge.



Wooden ramrod

## RANGE OF FIRE

The advantage of firearms was that they could hit an enemy before he could use a bladed weapon, such as a lance.

## WHEEL-LOCK PISTOL, north European, c. 17th century

Most early small arms were muzzle-loaders - loaded from the front or muzzle end



### MUSKET RESTS

Heavy matchlock muskets were fired from forked rests.

### MUSKETEER

Engraving of a musketeer with a smouldering match for his musket, and a horn powder flask.



Spout doubles as measure

Black powder



Engraving of David and Goliath

Made of flattened cow horn



Pure lead pistol balls

### POWDER FLASK

For safety's sake, powder flasks had to be made of non-ferrous materials such as cow horn. This powder flask, dating from 1608, would have been worn by a musketeer in the fashion shown in the engraving on the left.

### BREASTPLATE right

Armour had to be thickened to resist small arms fire, and so less of it could be worn. This older, thinner breastplate has been pierced by a musket ball fired at the wearer during the English Civil War of 1642-48.



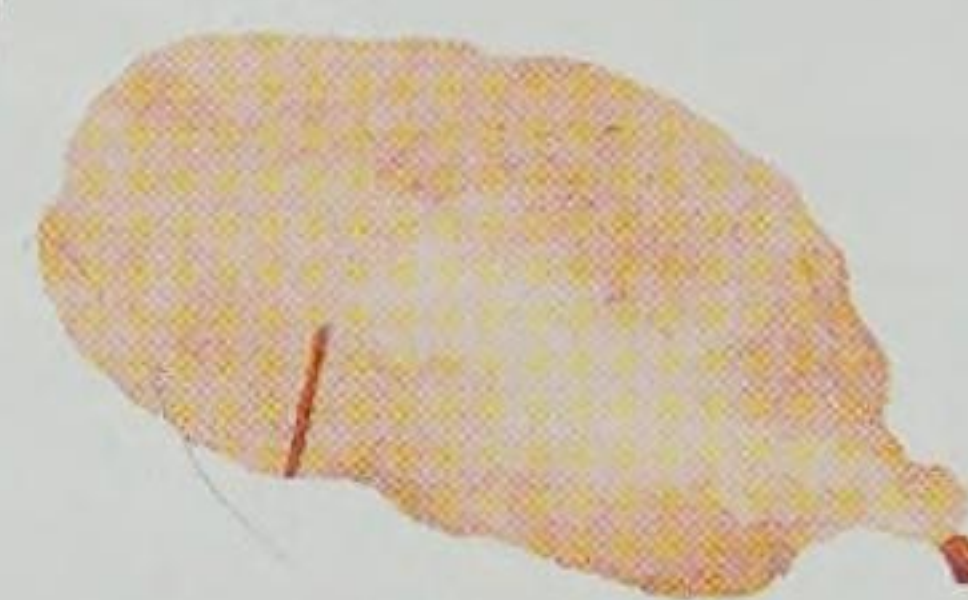




The pirate Long John Silver in Robert Louis Stevenson's *Treasure Island*

# Flintlock firearms

MORE RELIABLE THAN THE MATCHLOCK and cheaper than the wheel-lock (pp. 38-39), flintlock ignition was used on most European and American firearms from the late 17th century until the 1830s. Probably invented in France by Martin Le Bourgeois in the 1620s, the flintlock mechanism could be set in two positions - one for firing and one for safety. With its basic design improved only by a few details, the flintlock ignition was not only to dominate the battle-



**SPORTSMAN SHOOTING GAME**  
As the hunter fires his flintlock "fowling piece" the flash from the pan can be clearly seen.

fields of all the major wars of that period, but was an important civilian weapon, used for duelling (pp. 46-47), self-defence (pp. 48-49), and shooting game, with many of these weapons showing the highest standards of craftsmanship.



## Loading and firing a flintlock (also pp. 46-47)

- 1 Set lock to "half-cock" safety position.
- 2 Pour correct amount of powder from powder flask (p. 39) or cartridge down barrel.
- 3 Ram ball, wrapped in its patch (p. 46) or cartridge down barrel with ramrod.
- 4 Pour small amount of powder from powder flask into priming pan.
- 5 Close pan cover.
- 6 Set lock to "full-cock" position and fire.



Musket ball

### MUSKET CARTRIDGE POUCH

Each paper cartridge contains powder and ball for one shot.



Brass butt-cap

Brown walnut stock

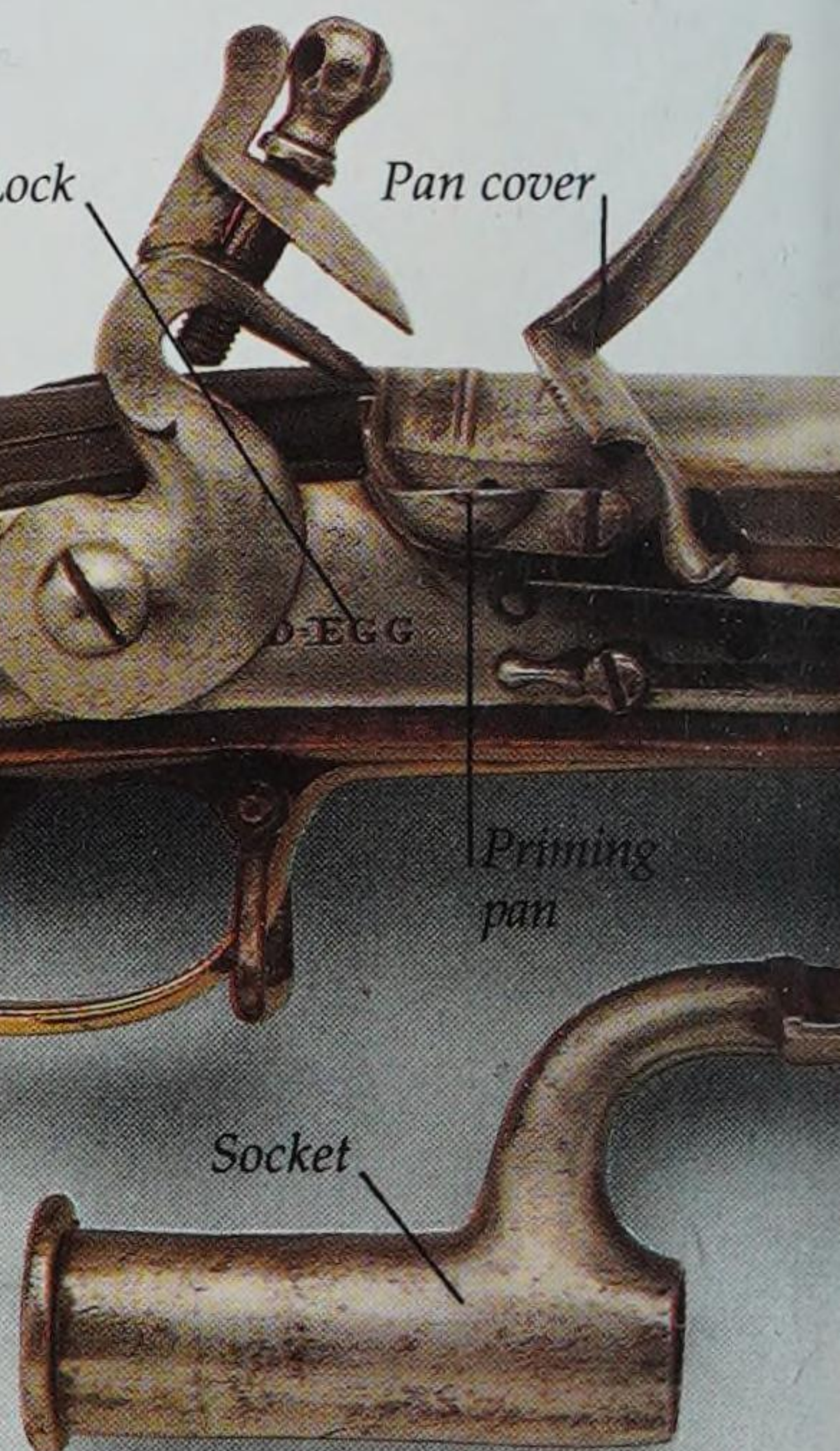


### FLINTLOCK MUSKET

This late 18th-century India Pattern musket comes from the family of longarms sometimes known as Brown Bess muskets. These muskets were so strong, simple to use and relatively reliable, they remained the main British infantry weapon from the 1720s to the 1840s.

### SOCKET BAYONET

This bayonet was designed to accompany Brown Bess muskets. Most European and North American armies used triangular-bladed bayonets with a socket to fit over the muzzle.





Ramrod  
Iron barrel

Lock at "half-cock"  
safety position

#### HOLSTER PISTOL

This fine example of a holster pistol was made in England about 1720. Holster pistols, with their longer than average barrel, would have been carried by a cavalry officer in holsters attached either side of his horse's saddle.

Fine silver  
side plate

Trigger-guard

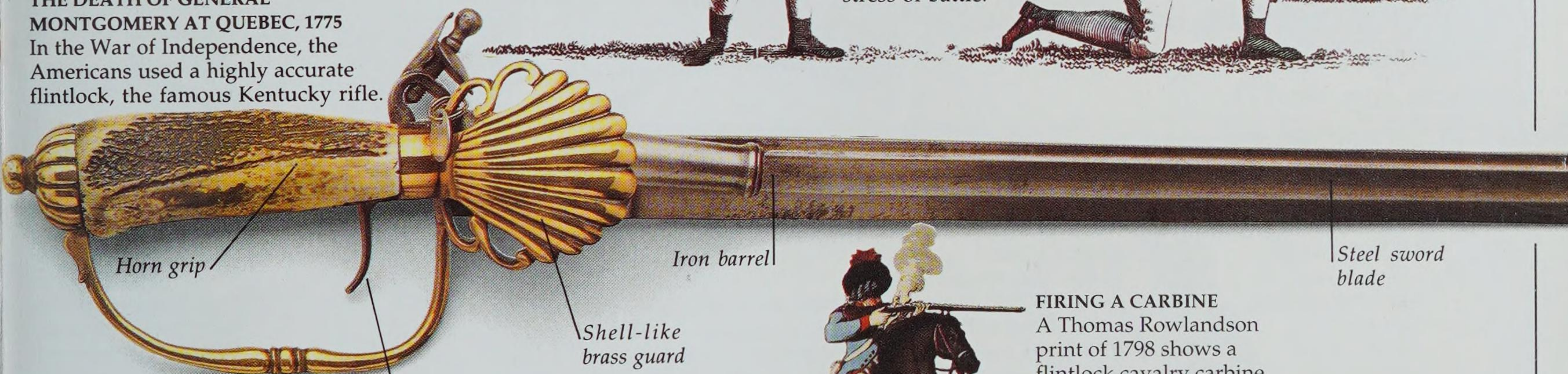
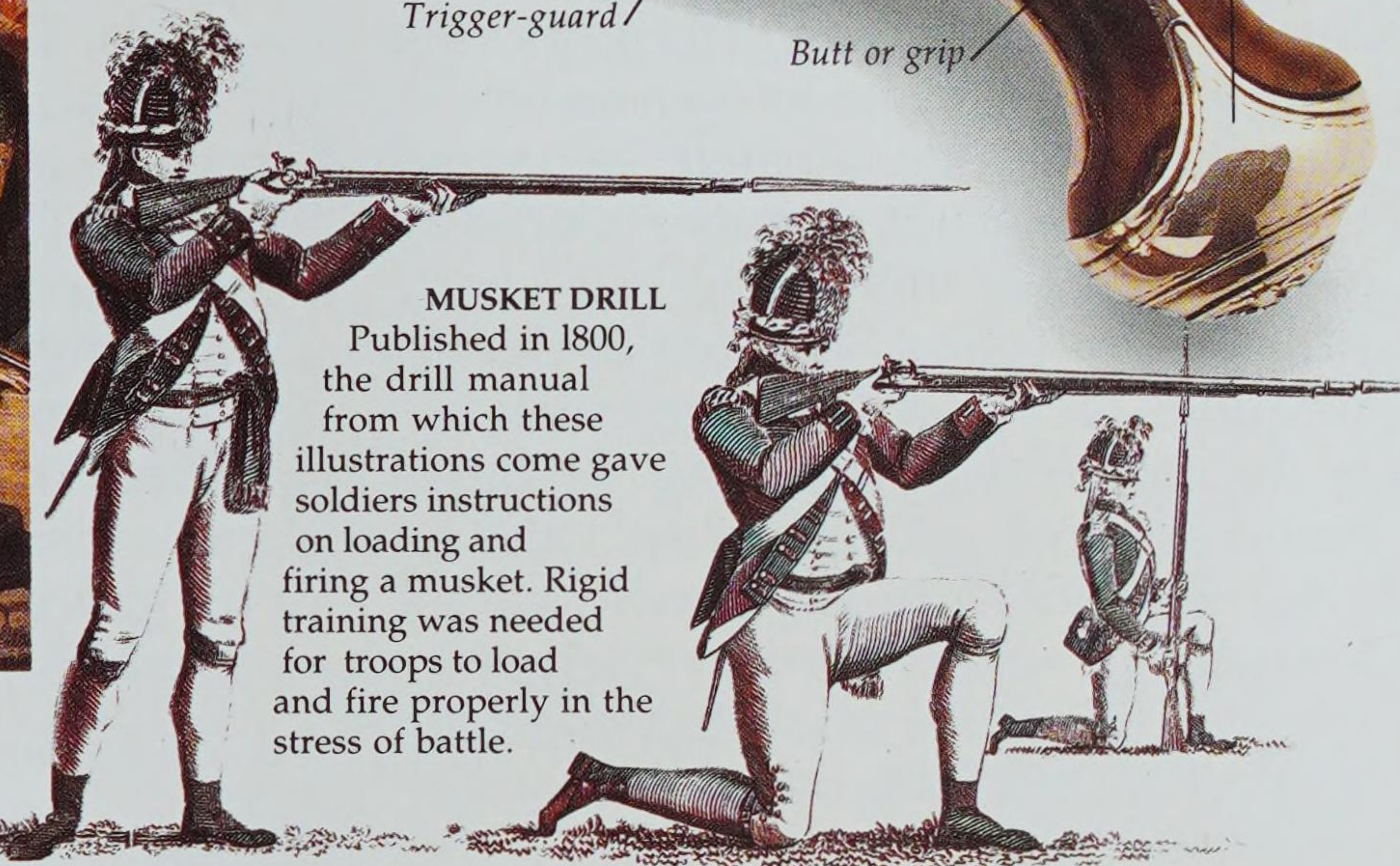
Butt or grip

Silver  
butt-cap



**THE DEATH OF GENERAL MONTGOMERY AT QUEBEC, 1775**  
In the War of Independence, the Americans used a highly accurate flintlock, the famous Kentucky rifle.

**MUSKET DRILL**  
Published in 1800, the drill manual from which these illustrations come gave soldiers instructions on loading and firing a musket. Rigid training was needed for troops to load and fire properly in the stress of battle.



Horn grip

Iron barrel

Steel sword  
blade

Shell-like  
brass guard

Trigger in  
centre of handle

#### SWORD PISTOL

One of the more unusual flintlock weapons was this hunting sword with a built-in pistol, designed to place two weapons in one hand.

#### FIRING A CARBINE

A Thomas Rowlandson print of 1798 shows a flintlock cavalry carbine being fired from the saddle. As carbines often had shorter barrels and were lighter than muskets, they were a more practical weapon to use on horseback.



Ramrod

Brass mount

Stiff leather

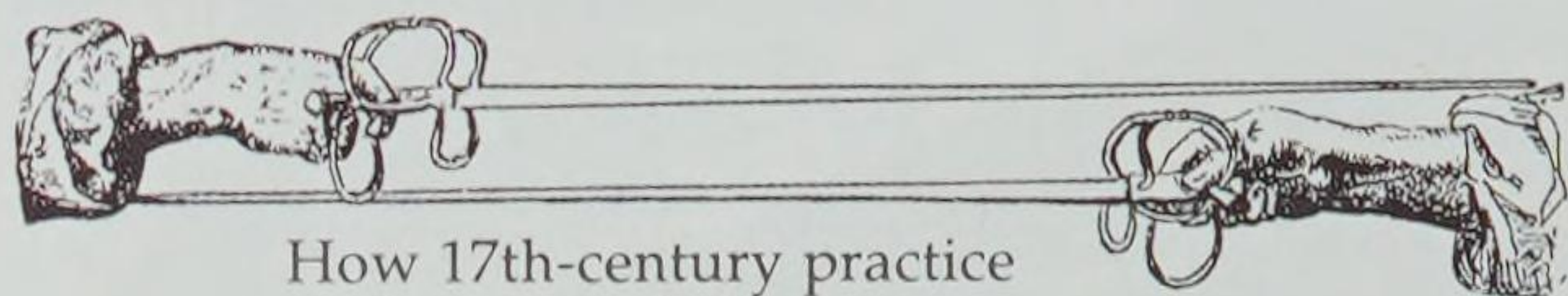
#### BAYONET SCABBARD

Made of leather, the bayonet scabbard has a brass hook to hold it in the "frog" or loop on the soldier's webbing (leather strapping).



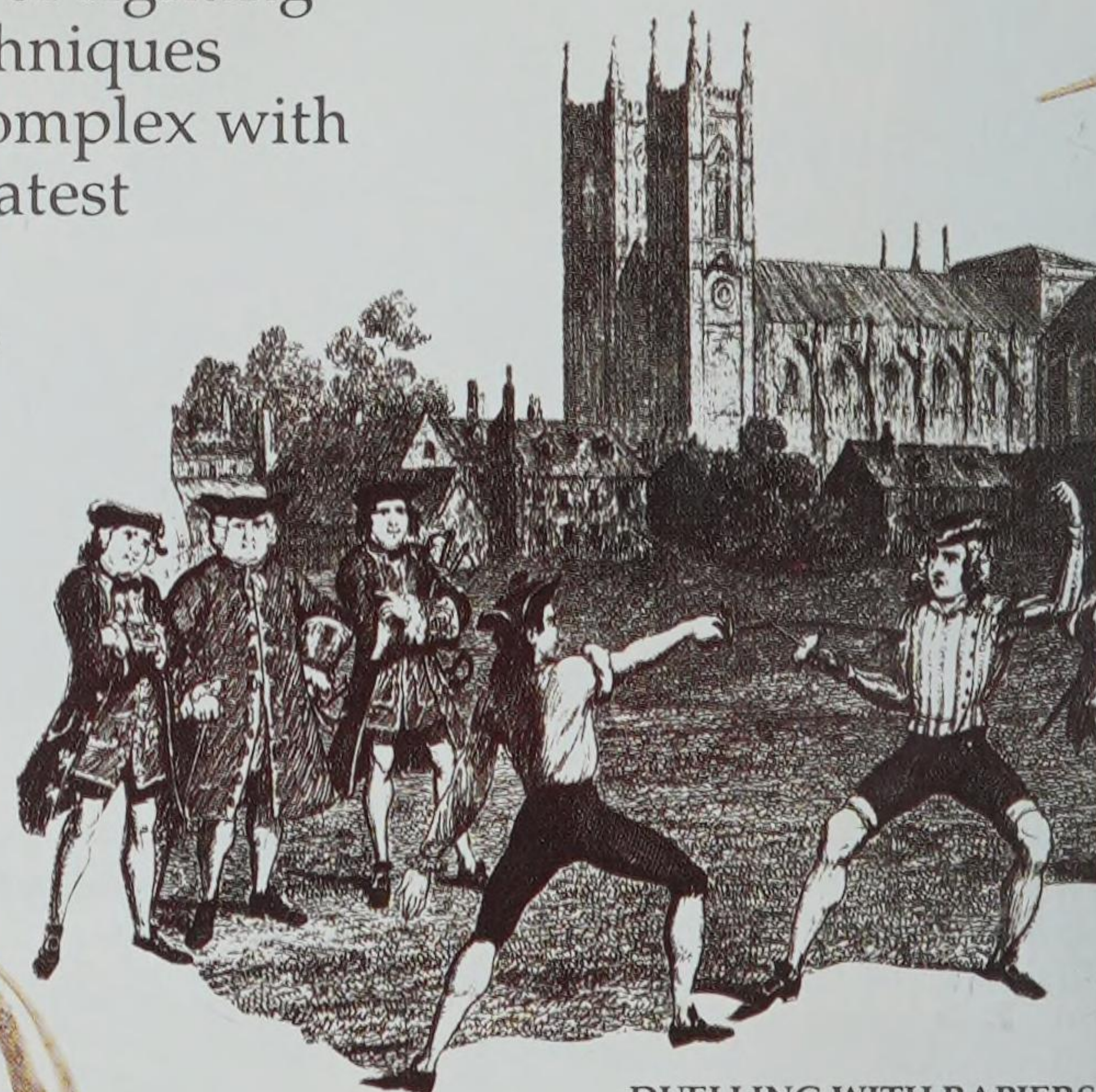


# Duelling swords



How 17th-century practice rapiers were held

ALTHOUGH FORMIDABLE WEAPONS, the swords taken into battle by medieval knights and foot soldiers had a relatively simple design (pp. 16-17). However, during the 16th century sword designs changed, with some blades becoming narrower, longer and more pointed. These swords, known as rapiers, were designed for well-off gentlemen and aristocrats, not only to defend themselves against casual attacks but also to take part in formal prearranged sword fights known as duels. The art of fighting with a rapier became known as fencing, and as fencing techniques became more sophisticated, sword guards became more complex with the need to protect a civilian's unarmoured hand. The greatest swordsmiths of this period came from Toledo in Spain, Milan in Italy, and Solingen in Germany, and many of the weapons they produced are artistically superb examples of the craft of swordmaking. By the 1650s, rapiers were being replaced as dress swords and duelling swords by a lighter, shorter type of sword with a simpler guard known as a smallsword or court sword. Gentlemen continued to wear smallswords until the end of the 1700s, by which time duels were being fought with pistols (pp. 46-47).



## DUELLING WITH RAPIERS

An 18th-century drawing by George Cruikshank for a novel called *The Miser's Daughter*. The duel is taking place in Tothill Fields in London, used as duelling grounds for several centuries.

Knuckle guard

## RAPIER, c. 1630

In the 1500s, thrusting swords known as rapiers became popular with civilians. Because they had short grips and were impossible to hold with the whole hand, some rapiers had distinctive guards that protected the thumb and forefinger by partly covering the blade.

## "THE THREE MUSKETEERS"

The famous historical novel by Alexandre Dumas takes place in France from 1625 to 1665. Wishing to become one of Louis XIII's guardsmen, D'Artagnan involves himself in duels with three renowned swordsmen. The joint exploits of D'Artagnan and these three musketeers form the book's narrative.

Guard forming two loops that surround the sword's blade, known as pas d'âne

Base of hilt resembling twigs or small branches

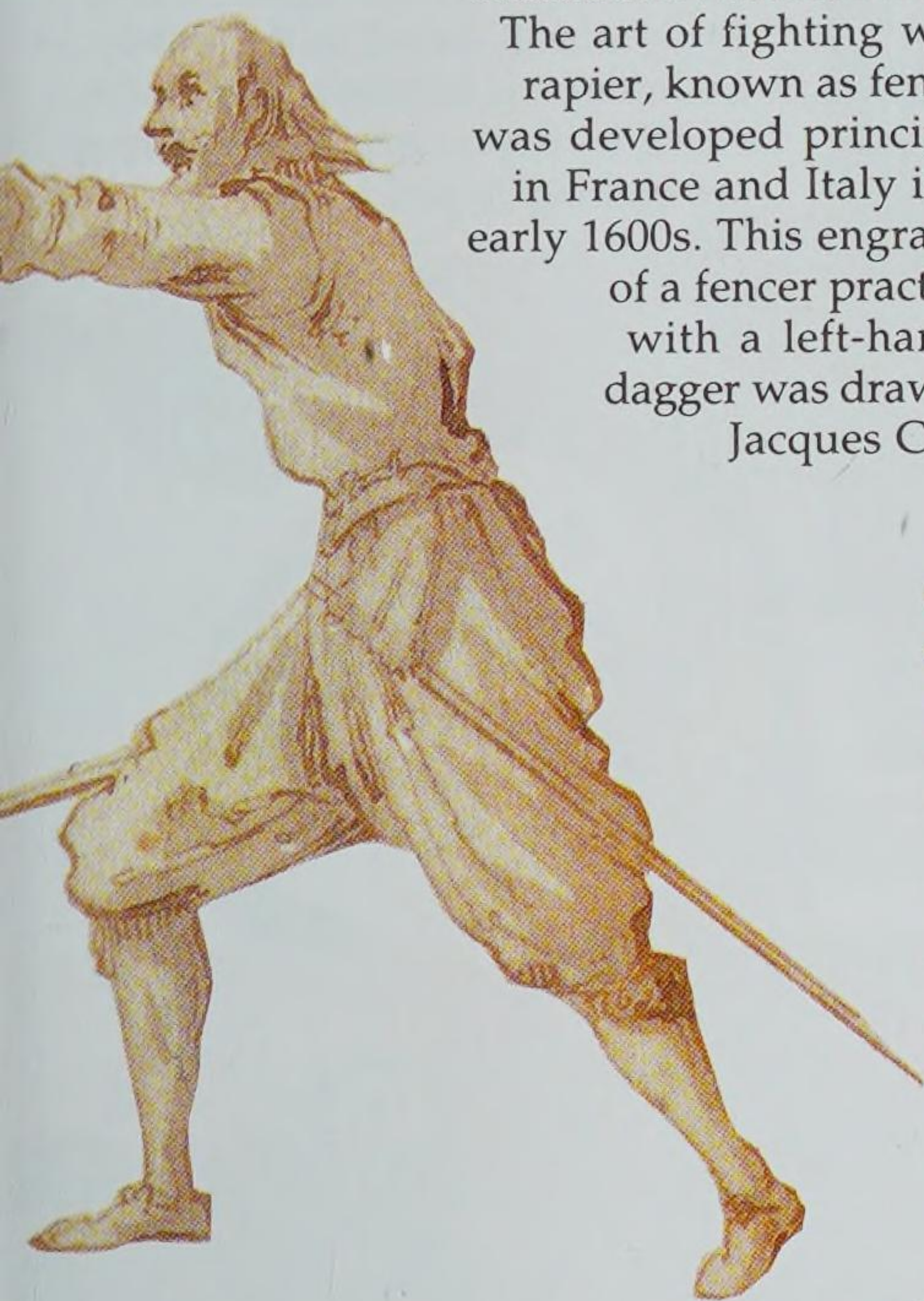
Counter-curved quillons





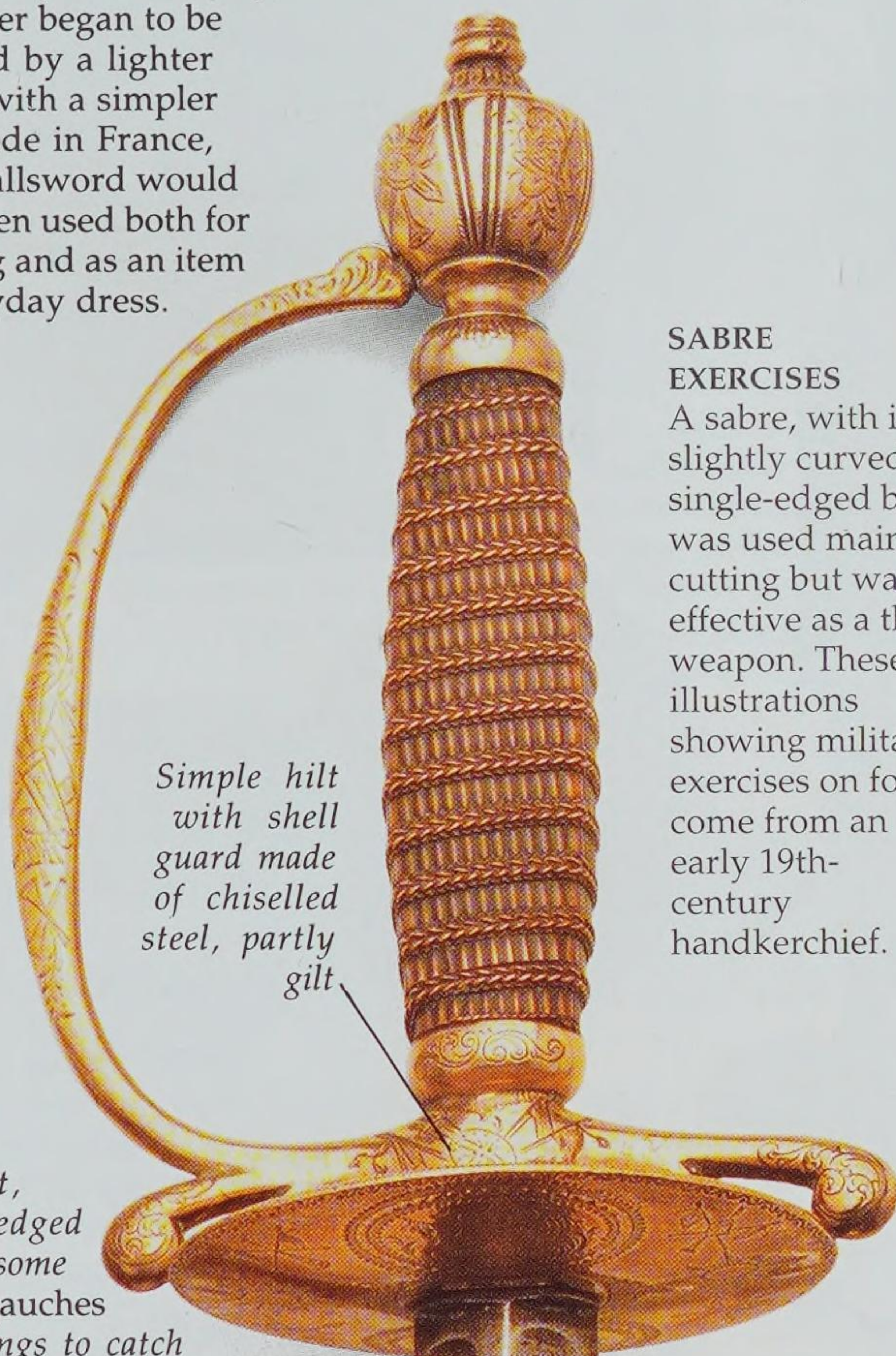
### PARRYING WITH A DAGGER

The art of fighting with a rapier, known as fencing, was developed principally in France and Italy in the early 1600s. This engraving of a fencer practising with a left-handed dagger was drawn by Jacques Callot.



### SMALLSWORD, c. 1740

In the early 17th century, the rapier began to be replaced by a lighter sword with a simpler hilt. Made in France, this smallsword would have been used both for duelling and as an item of everyday dress.



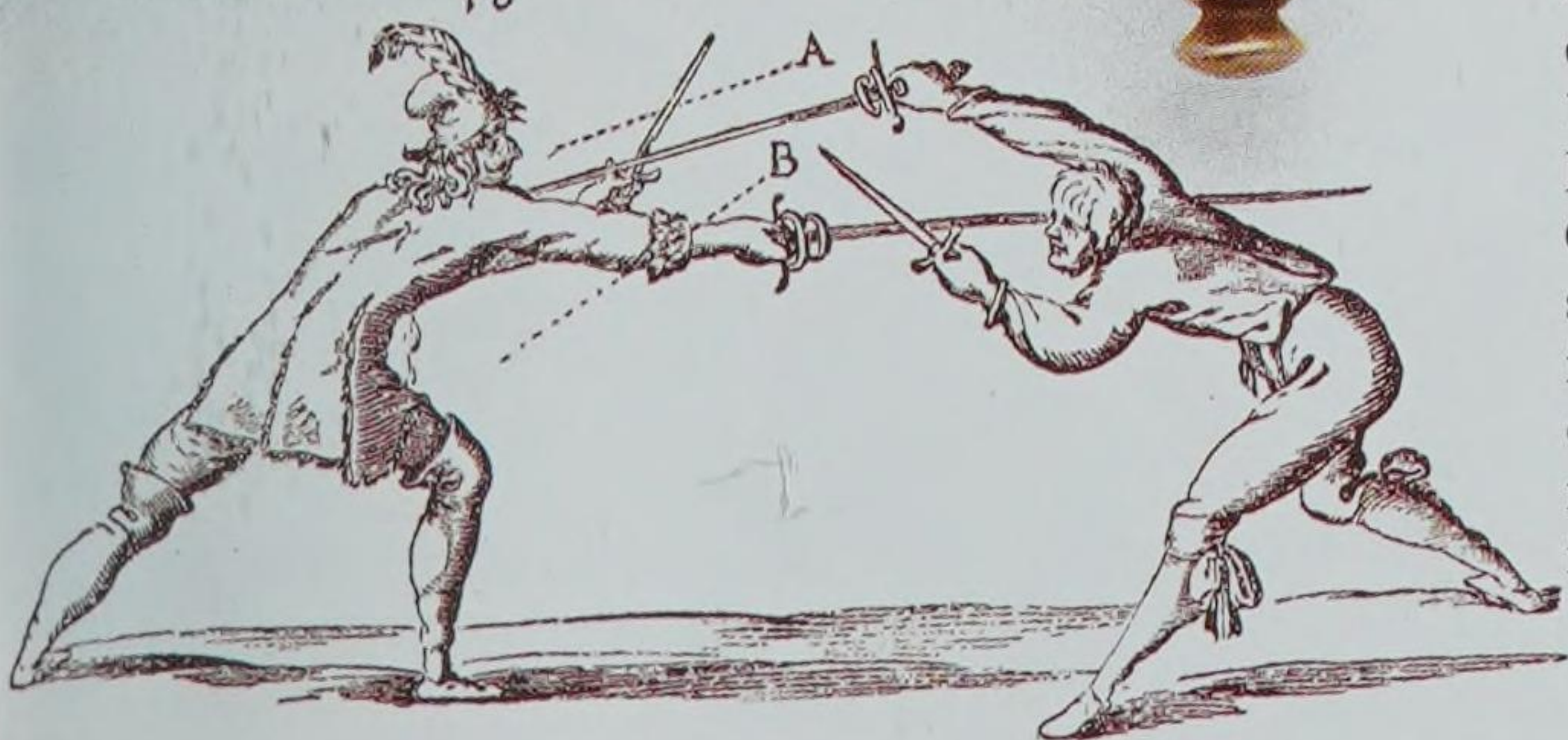
Straight, double-edged blade - some mains gauches had prongs to catch an adversary's sword.

As the grip is very short, the thumb extended onto the blade

### PARRYING DAGGER, c. 1650 left

A special dagger for parrying an opponent's blow in duelling was misleadingly called a *main gauche* (French for left hand), even though it could be held in either hand.

Long, thin double-edged blade



### FENCING MOVE, c. 1640

The swordsman on the right, using a rapier and parrying dagger, passes his adversary, and disengages under his dagger, thus killing him.

Light, triangular-sectioned thrusting blade

### A CELEBRATED FRENCH DUEL right

A 19th-century engraving depicts a duel, fought in Paris in 1578, that involved Henri III's favourite, Quélus. The duellists' seconds also became involved, and at the end of the duel three men received mortal wounds, including Quélus.

### SABRE

#### EXERCISES

A sabre, with its slightly curved, single-edged blade, was used mainly for cutting but was also effective as a thrusting weapon. These three illustrations showing military exercises on foot come from an early 19th-century handkerchief.



### SIX SABRE CUTS

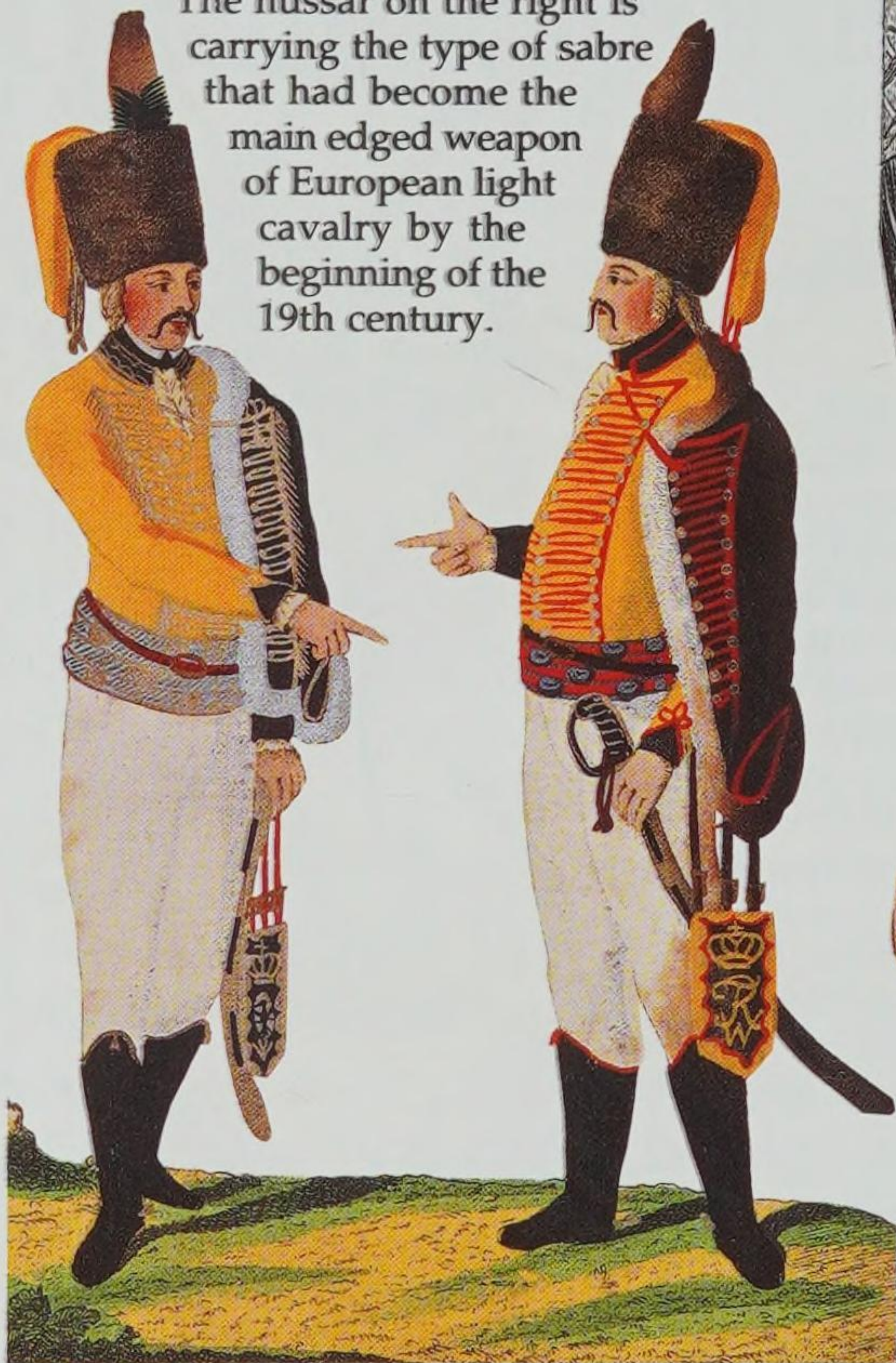
A face on the handkerchief of sabre sword exercises (above), shows the directions of the six cuts that could be aimed at an opponent's head.





# PRUSSIAN HUSSARS

The hussar on the right is carrying the type of sabre that had become the main edged weapon of European light cavalry by the beginning of the 19th century.



## SWORD CUTLER'S SHOP, c. 1755

In a Parisian sword cutler's shop, a customer is testing a new blade, while workmen near the window are making sword hilts.



## BACKSWORD, c.1620

A backsword was a type of military sword used by European cavalry in the 17th century for both cutting and thrusting at an opponent in battle.

Guard for protecting hand, similar to that of rapier

Blade of 17th-century parrying dagger (p. 43)



Blade of 17th-century rapier (pp. 42-43)



## THE BATTLE OF DENAIN left

In this painting of a battle fought in 1712, between the French and an Anglo-Dutch army, the French victor, Marechal de Villars, uses his smallsword to rally his men.



In England broadswords with this decoration were called "mortuary" swords as the heads were said to refer to the executed King Charles I

Bars completely protected the hand

Running wolf engraving, originally used by well-known German blade-makers





Hilt engraved with trophies of arms

Etched, double-edged blade

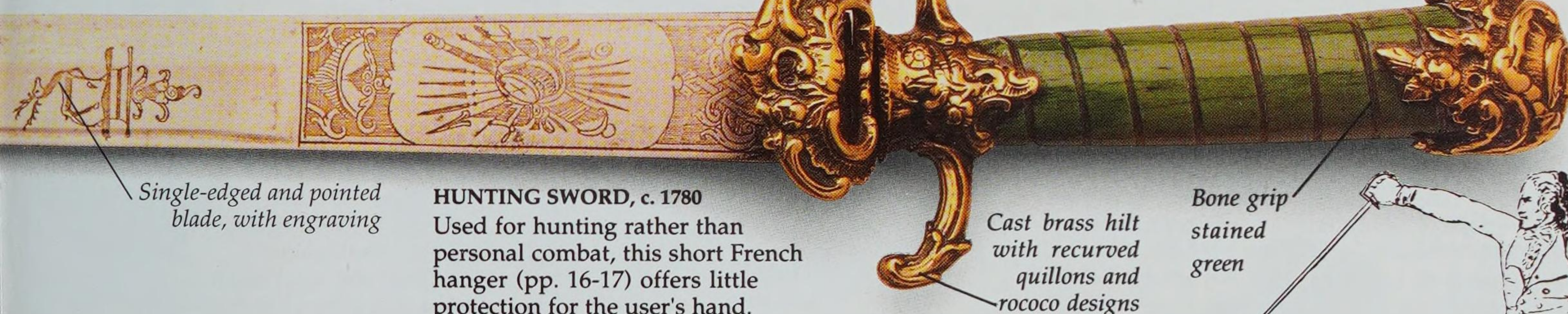
#### ENGLISH SMALLSWORD, c. 1780

Being worn for fashion as well as protection, smallswords (p. 43) often had highly decorated hilts and blades. Civilians wore these swords until the end of the 18th century, by which time they were little more than fashion accessories, called "town" or "walking" swords.

**SMALLSWORD EXERCISES, c. 1686**  
By the end of the 1600s, many fencing masters were teaching new techniques in sword play, such as parrying with the sword blade rather than with a dagger. This illustration of sword exercises comes from a French treatise.



Straight, thick, single-edged blade



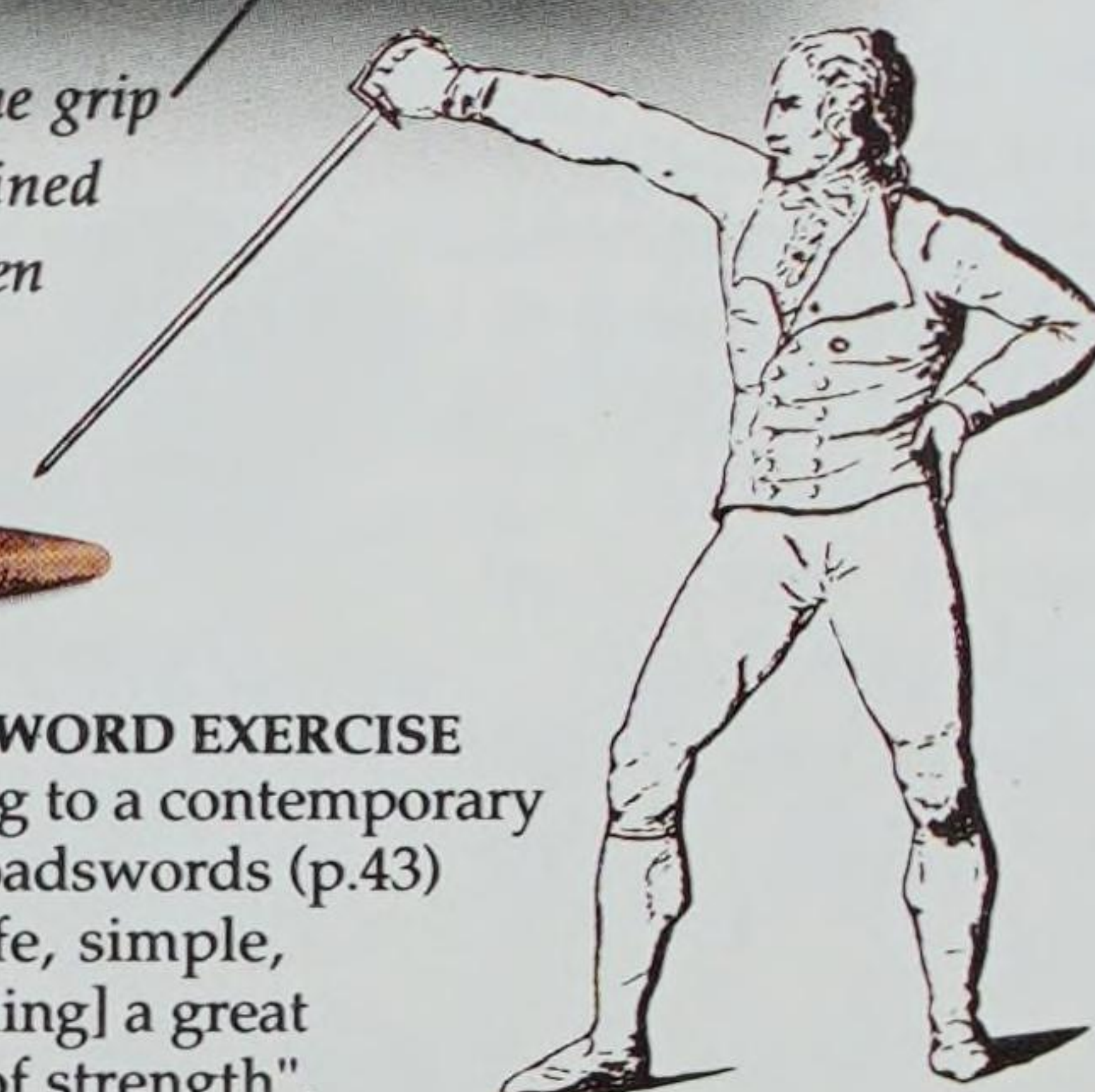
Single-edged and pointed blade, with engraving

#### HUNTING SWORD, c. 1780

Used for hunting rather than personal combat, this short French hanger (pp. 16-17) offers little protection for the user's hand.

Cast brass hilt with recurved quillons and rococo designs

Bone grip stained green



#### BROADSWORD EXERCISE

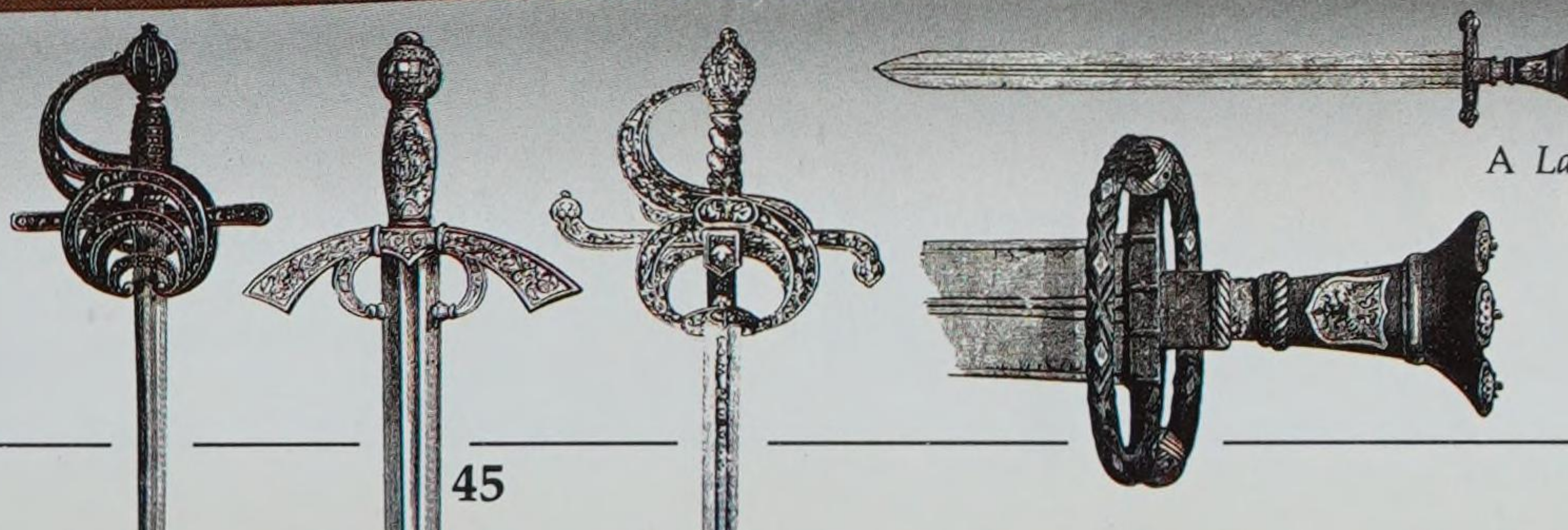
According to a contemporary book, broadswords (p.43) were "safe, simple, but [needing] a great amount of strength".

#### BROADSWORD c. 1610 below

This type of heavy, double-edged military sword was known as a broadsword. Swords of this type were popular cavalry weapons from the 17th to the 19th century.

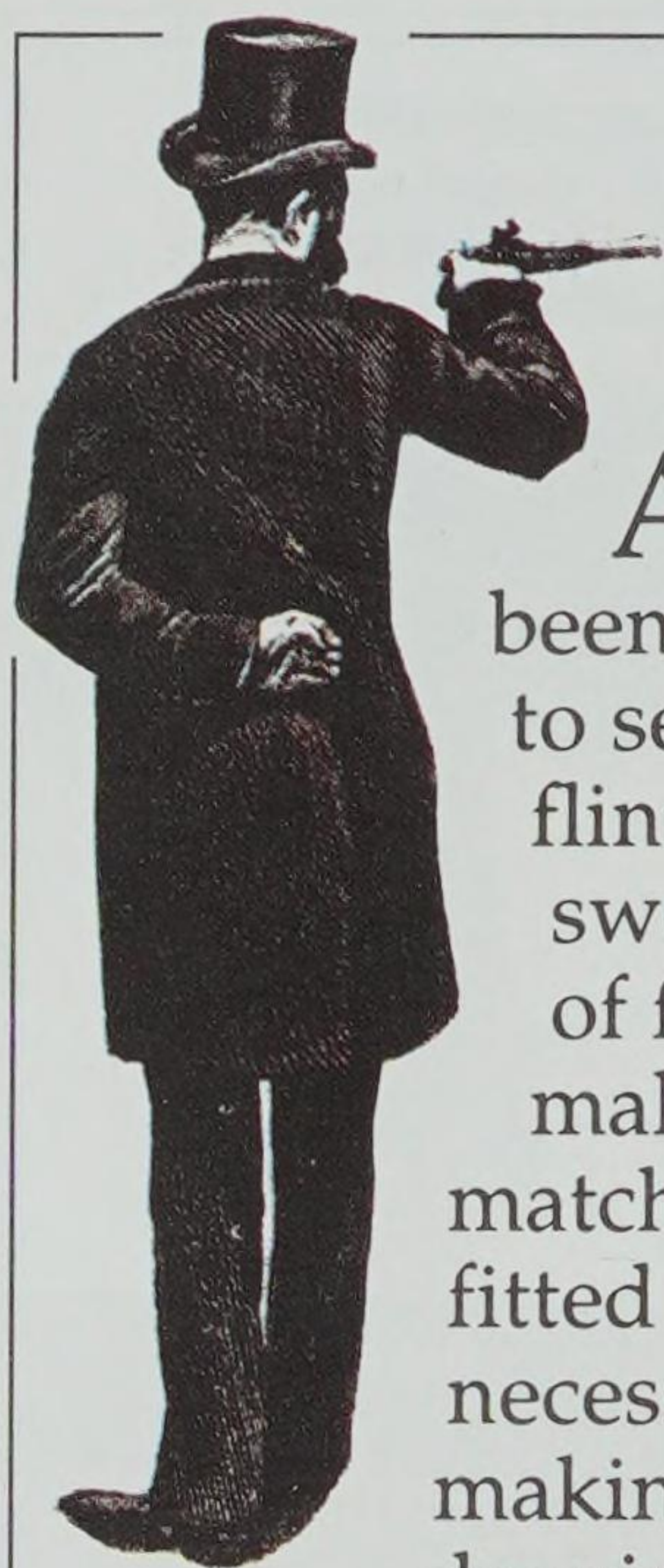
#### 16TH-CENTURY HILTS

Far simpler than the rapier hilts (left and right) designed to protect the hand in duelling, is the hilt of the fighting broadsword, used by a *Landsknecht*, a German foot soldier, in the 1500s.



A *Landsknecht's* broadsword and hilt



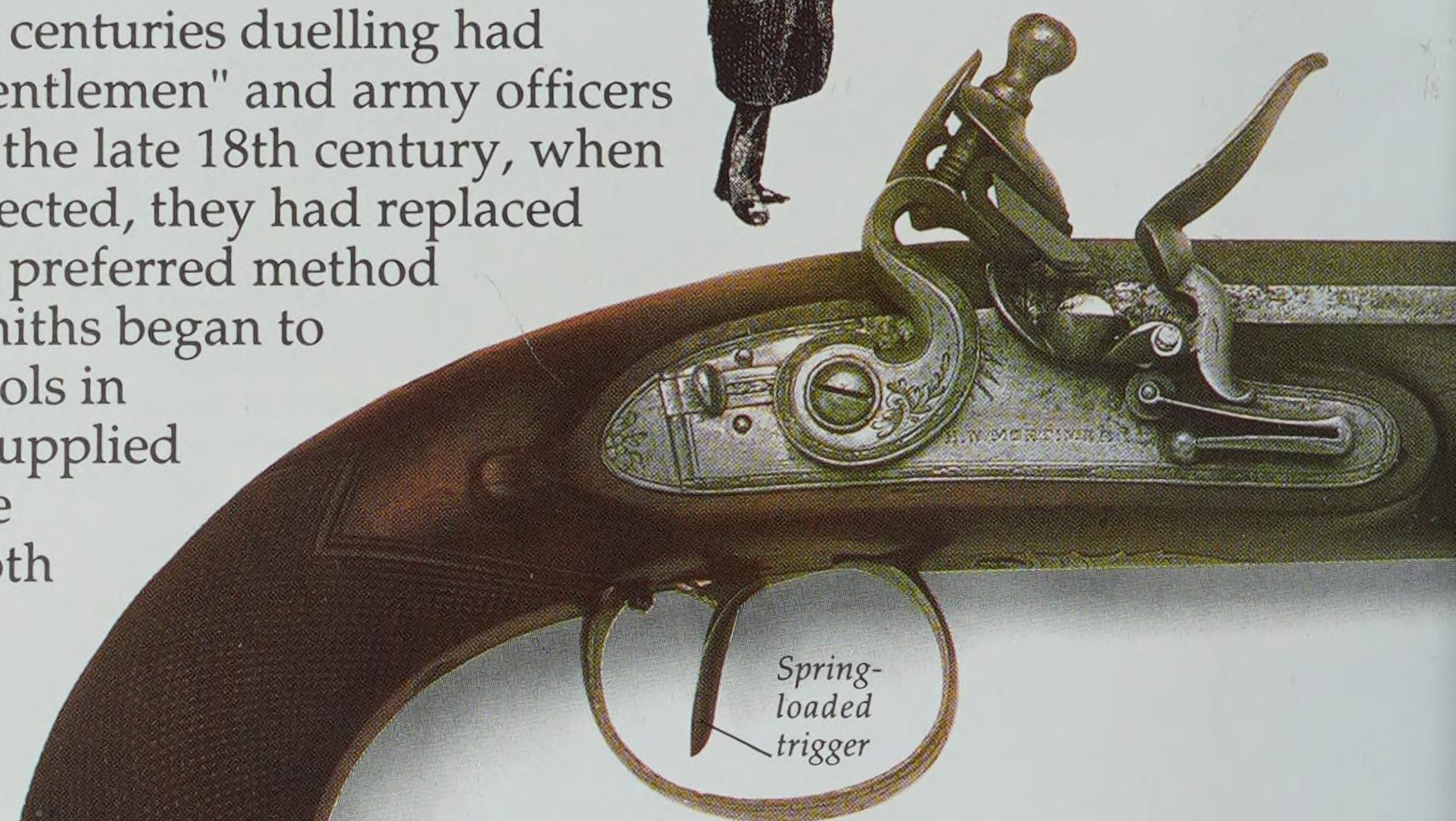


# Duelling pistols

ALTHOUGH ILLEGAL, for centuries duelling had been a popular way for "gentlemen" and army officers to settle their quarrels. By the late 18th century, when flintlock pistols were perfected, they had replaced swords (pp. 42-43) as the preferred method of fighting a duel. Gunsmiths began to make special duelling pistols in matched pairs, which they supplied fitted into a case with all the necessary accessories for both making the bullets, and cleaning and loading the pistols. In order that duelling pistols should be as accurate as possible the pistols were of the highest quality, with added refinements such as sights and special triggers. All duelling pistols were muzzle-loaders (pp. 38-39), and until about 1820-30 all used flintlock ignition.



THE END OF THE DUELLING ERA  
A French duellist, c. 1887. His opponent is shown far left. Standing side-on presented less of a target.



Spring-loaded trigger

**SENSITIVE TRIGGER** *above*  
Many duelling pistols had a special "hair" or "set" trigger, worked by an extra spring in the lock. These light triggers allowed the user to fire the pistol without disturbing his aim.

The grip - part of stock where pistol is held

The butt - rear part of stock

Wooden end for holding ramrod

**WOODEN STOCK** *right*  
In all duelling pistols the wooden stock was carefully made so that the butt would fit comfortably in the duellist's hand. Some pistols had a squarer saw-handled butt to assist the grip.

## Making a bullet

The lead ball or bullet was made at home by the firer, using a bullet mould provided with the pistol. Lead was melted over a fire and poured into the mould. After a few seconds the scissor-like mould was opened and the ball shaken out. Excess lead or "sprue" was cut off with the shears incorporated into the mould handles.



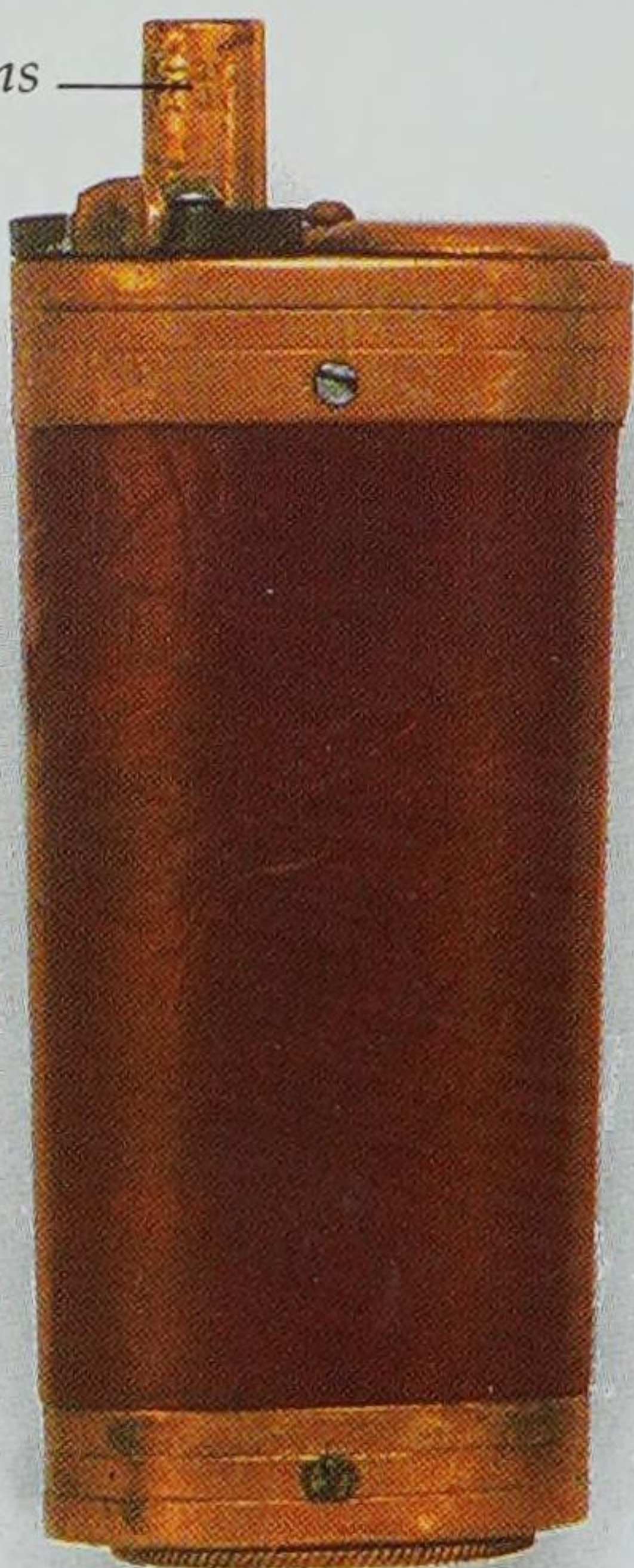
Lead bullets

Black gunpowder



**LINEN PATCH**  
To fit tightly in the barrel, the bullet was wrapped in a cloth or leather patch.

Nozzle forms a measure



**BULLET MOULD**  
Bullets were made by pouring melted lead into the hollow chamber of the bullet mould (p. 57).



**POWDER FLASK**  
Gunpowder was kept in a powder flask. Originally made of wood or horn (p. 39), by the 19th century most powder flasks were made of metal. When self-contained cartridges were introduced, powder flasks became obsolete.

**RAMROD**  
A wood or metal ramrod (kept in a recess below the barrel) was used to push the ball and patch down the bore. Many ramrods had special attachments for cleaning out the bore.

Metal end for ramming bullet down bore

**ALEKSANDR PUSHKIN**  
Eminent men who took part in duels included the British general and statesman, the Duke of Wellington, and the French politician Georges Clemenceau. A famous victim was the great Russian writer Pushkin, killed in a duel with his wife's lover in 1837.





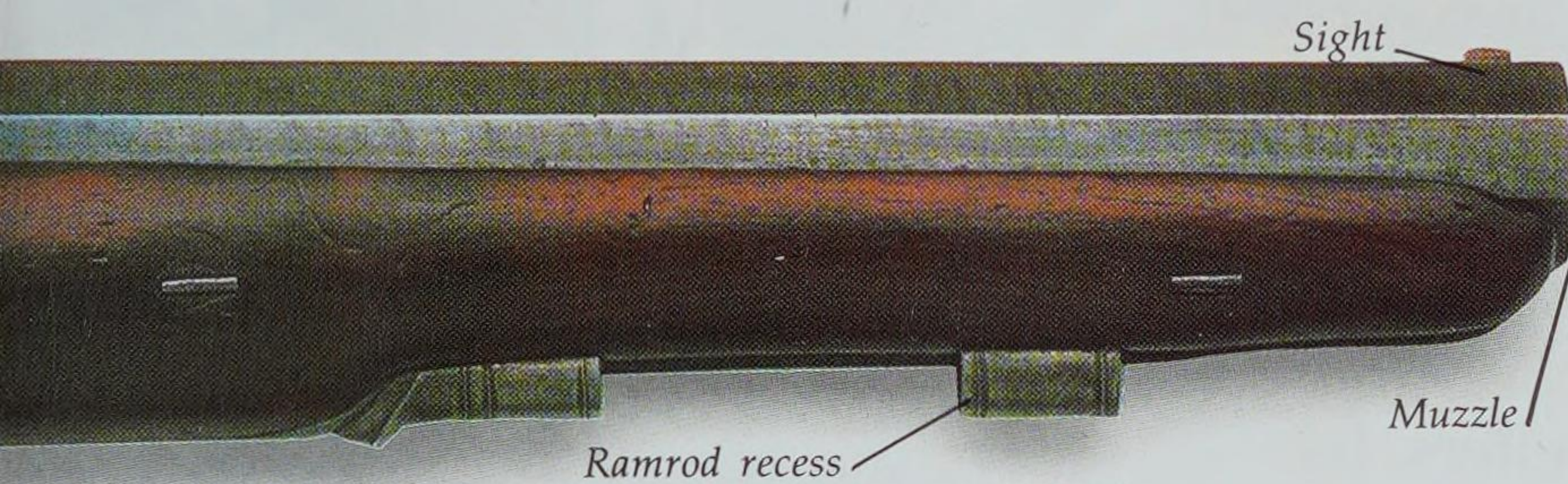


#### AMERICAN ANTI-DUELLING CARTOON, c. 1821 left

When this anti-duelling cartoon was published in Philadelphia, duelling was as popular in America as it was in countries such as France and England.

#### AN AFFAIR OF HONOUR, c. 1820

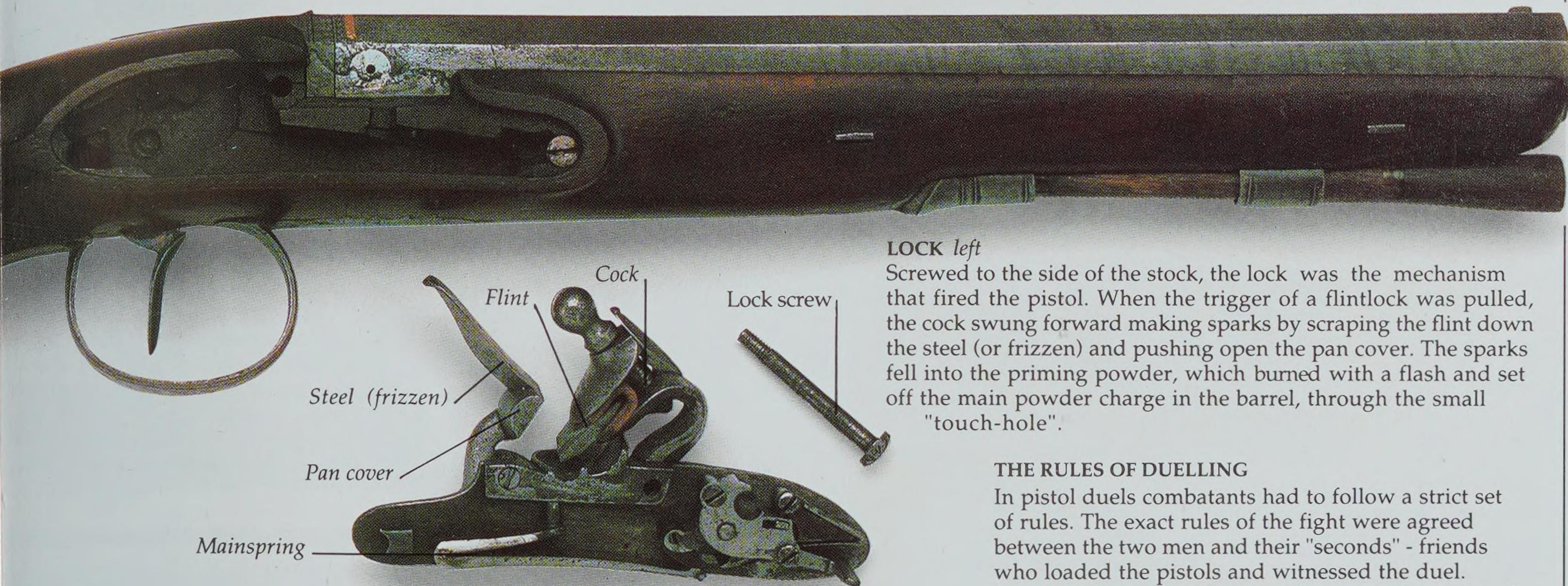
Duels were called "affairs of honour". A gentleman who considered himself insulted by the behaviour of another would challenge him to a duel. To refuse to be "called out" cast a bad slur on a gentleman's honour. Robert Cruikshank painted this fatal duel at the height of the duelling era.



#### BARREL

Duelling pistols were muzzle-loaders (pp. 38-39). The outside of the barrel was usually octagonal in shape, and fitted with sights.

#### A PAIR OF ENGLISH DUELLING PISTOLS, c. 1800 (lock of lower pistol shown separately)

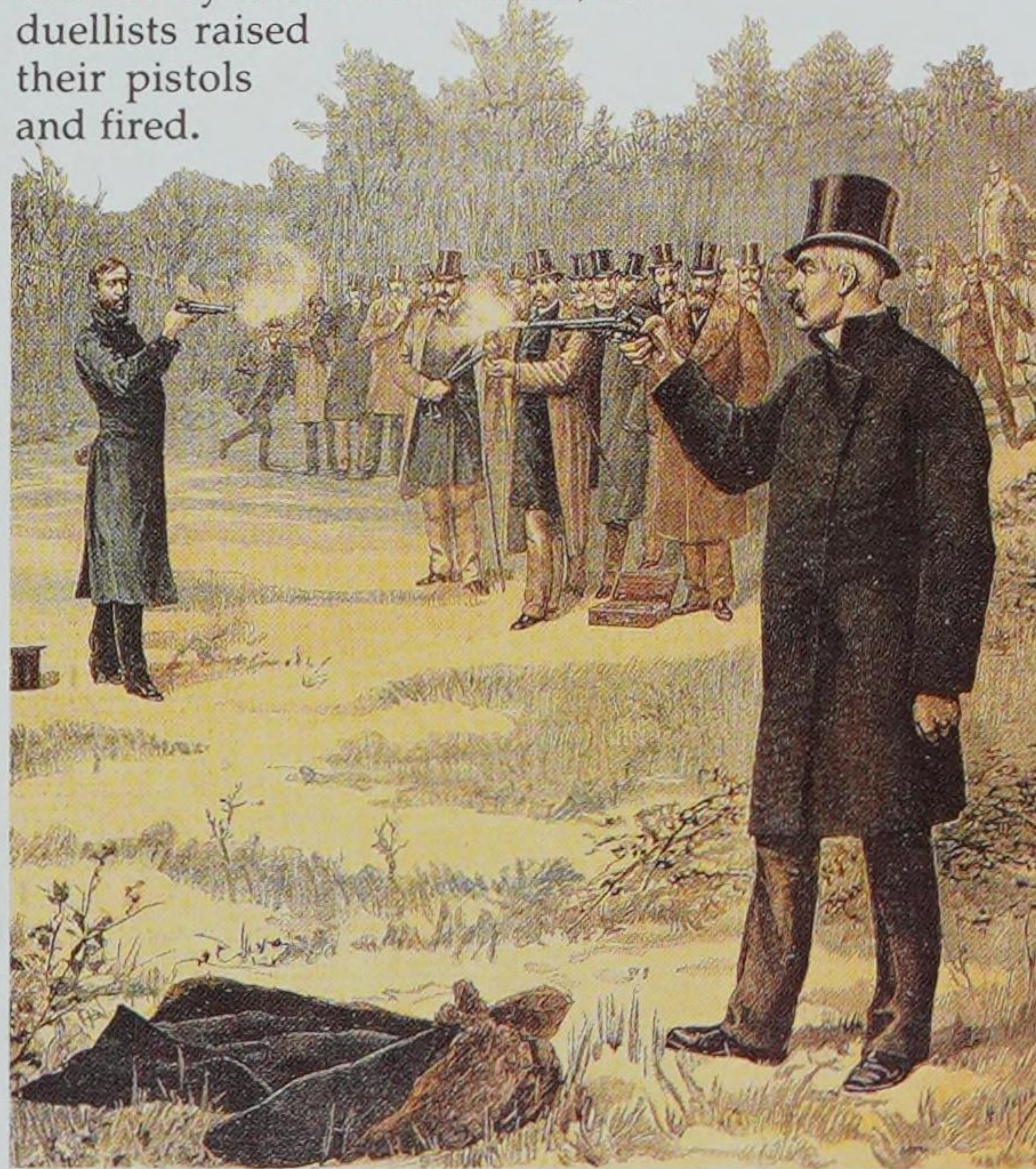


#### LOCK left

Screwed to the side of the stock, the lock was the mechanism that fired the pistol. When the trigger of a flintlock was pulled, the cock swung forward making sparks by scraping the flint down the steel (or frizzen) and pushing open the pan cover. The sparks fell into the priming powder, which burned with a flash and set off the main powder charge in the barrel, through the small "touch-hole".

#### THE RULES OF DUELLING

In pistol duels combatants had to follow a strict set of rules. The exact rules of the fight were agreed between the two men and their "seconds" - friends who loaded the pistols and witnessed the duel. Usually, the two duellists stood an agreed number of paces apart, with their pistols pointing at the ground. At a given signal, such as the dropping of a handkerchief by one of the seconds, the duellists raised their pistols and fired.



## Cleaning a flintlock

- 1 Extract any unfired ball and powder from barrel using tool attached to ramrod or special cleaning rod.
- 2 Clean and oil empty barrel with cloth attached to ramrod or cleaning rod.
- 3 Brush away burnt gunpowder in and around priming pan.
- 4 Oil lock.
- 5 Replace flint if worn out.



#### TURNSCREW

A turncrew was used for removing the lock.



#### PAN BRUSH

The priming pan needed frequent cleaning.

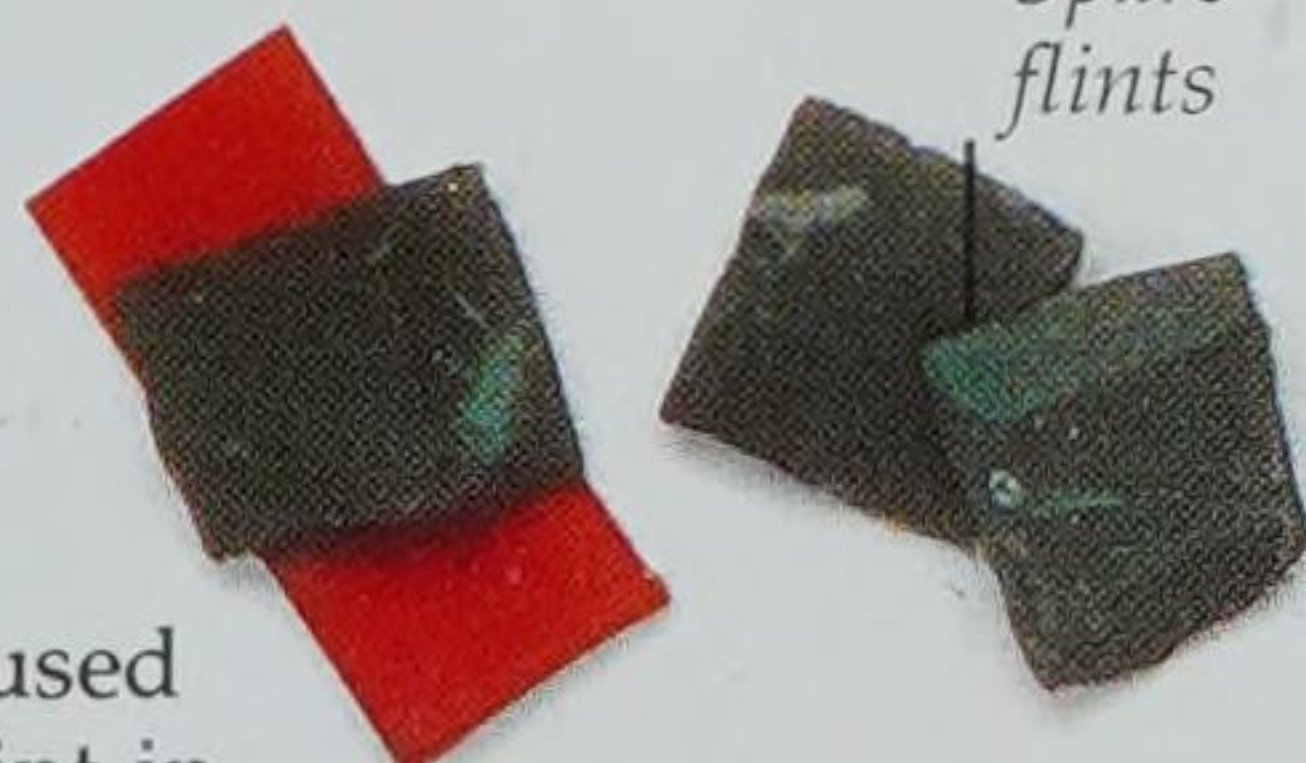


Oil can for  
oiling lock  
and barrel



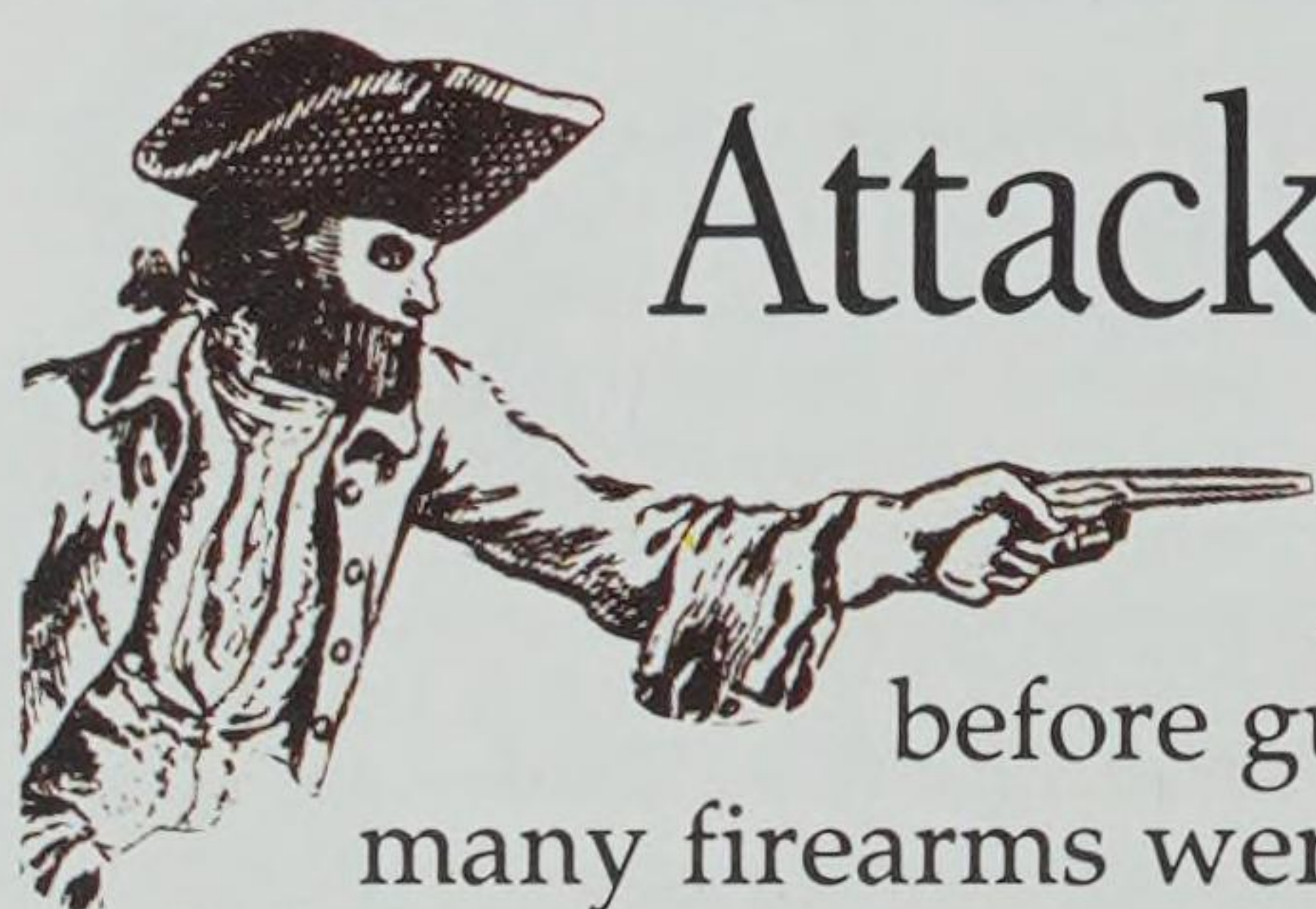
#### FLINTS AND LEATHERS

Leather was used to grip the flint in the jaws of the lock.



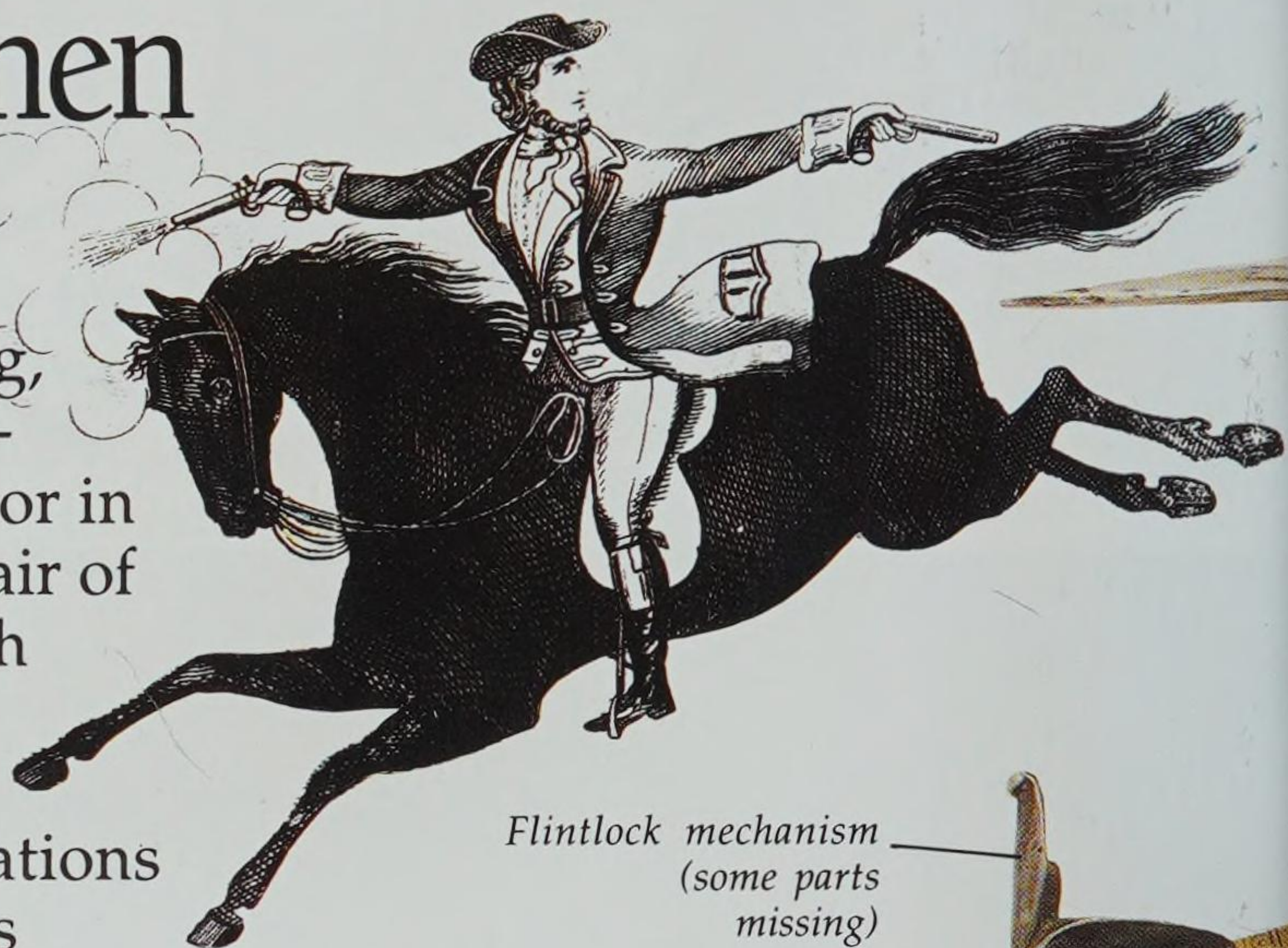
#### Spare flints





# Attack by highwaymen

IN THE LAWLESS days before guns were subject to licensing, many firearms were made or adapted for self-defence against armed robbers, either on the road or in the home. A gentleman on horseback could carry a pair of holster pistols on his saddle; when travelling by coach he could keep a small pistol in his coat pocket, or he or the coach's guard could carry a blunderbuss. The blunderbuss was well suited to close-range confrontations and was used to defend ships as well as travellers. Its wide muzzle helped intimidate an opponent and, if that failed to deter, its charge of numerous lead balls gave its nervous owner a better chance of hitting the target. Blunderbusses were often fitted with spring bayonets for additional protection, and pistols butts could also be used as clubs. Inevitably, such weapons were equally suited to a robber's needs.



Flintlock mechanism (some parts missing)



## FOOTPADS ATTACKING A TRAVELLER

This 1813 cartoon by Thomas Rowlandson shows a traveller being held up by three footpads, armed with pistols.

**FLINTLOCK BLUNDERBUSS**  
Blunderbusses fired a number of small shot for close-range effect. This late 18th-century blunderbuss has a spring-loaded bayonet - on releasing the catch the bayonet would flip forward and lock in position.

Ramrod

Flintlock mechanism of box-lock type

Two brass barrels side-by-side

Silver butt-cap

**POCKET PISTOL**  
With a double-barrelled pistol, both barrels were fired by the same lock. The iron slider on the box-like frame selected which barrel was connected with the flash pan. This particular pocket pistol was made in London, c. 1785.



Partially opened  
spring bayonet

Bayonet spring  
and lock

Bayonet  
catch

Brass barrel

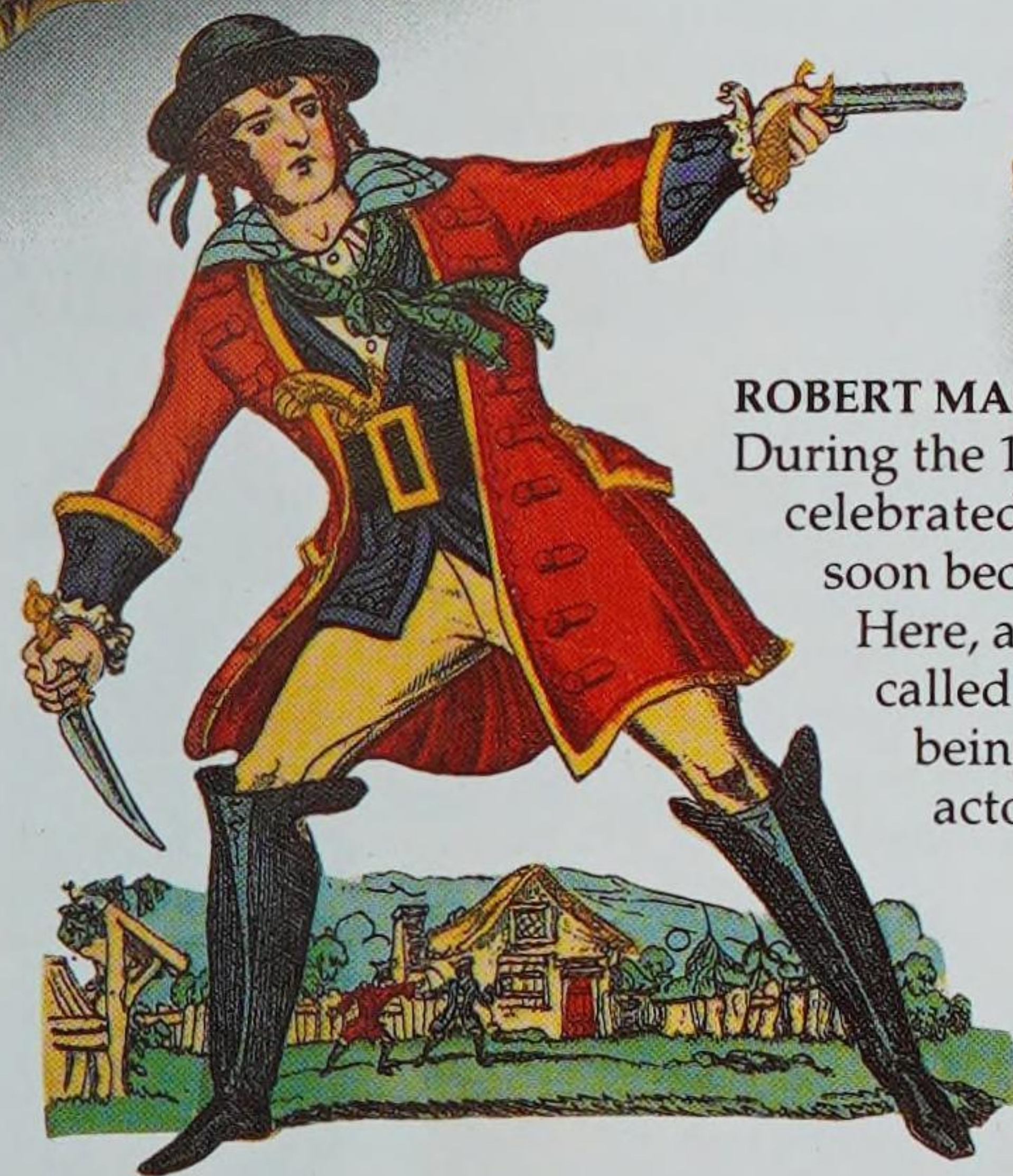
Ramrod

#### DICK TURPIN

During the 1730s Dick Turpin, the legendary highwayman, was the most wanted man in England. Here Turpin is shown improbably firing two pistols in opposite directions, whilst jumping a toll-gate on his famous horse Black Bess.

#### TRICORNE HAT

A three-cornered or tricorne hat would have been worn by the more respectable 18th-century highwaymen.



#### ROBERT MACAIRE

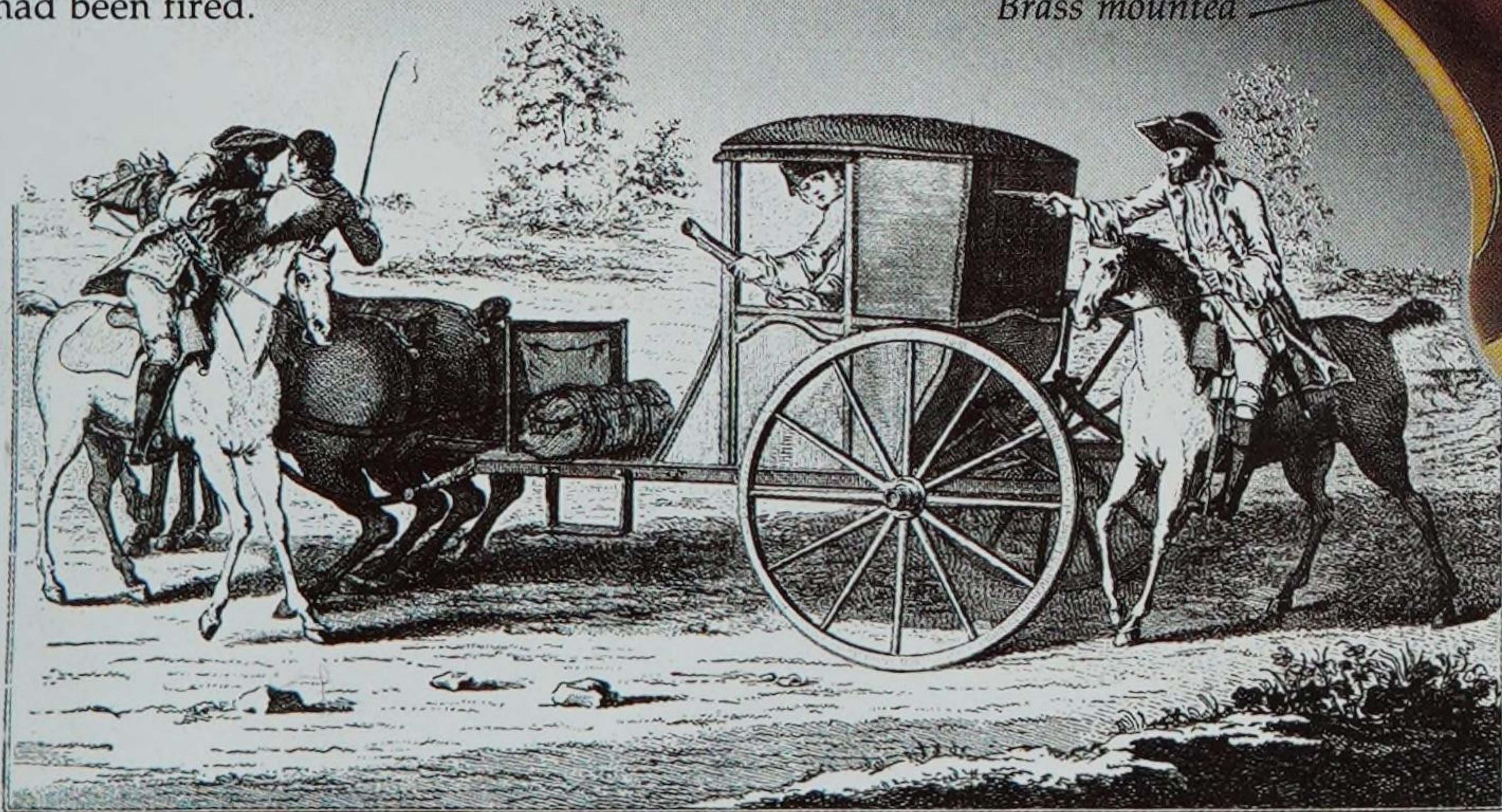
During the 18th century celebrated highwaymen soon became folk heroes. Here, a notorious robber called Robert Macaire is being portrayed by an actor called Mr Hicks.

#### HOLSTER PISTOL

The butt-cap of this early 18th-century holster pistol allowed the pistol to be reversed and used as a club once the single shot had been fired.

Brass mounted

Butt-cap



#### AN ATTACK BY HIGHWAYMEN

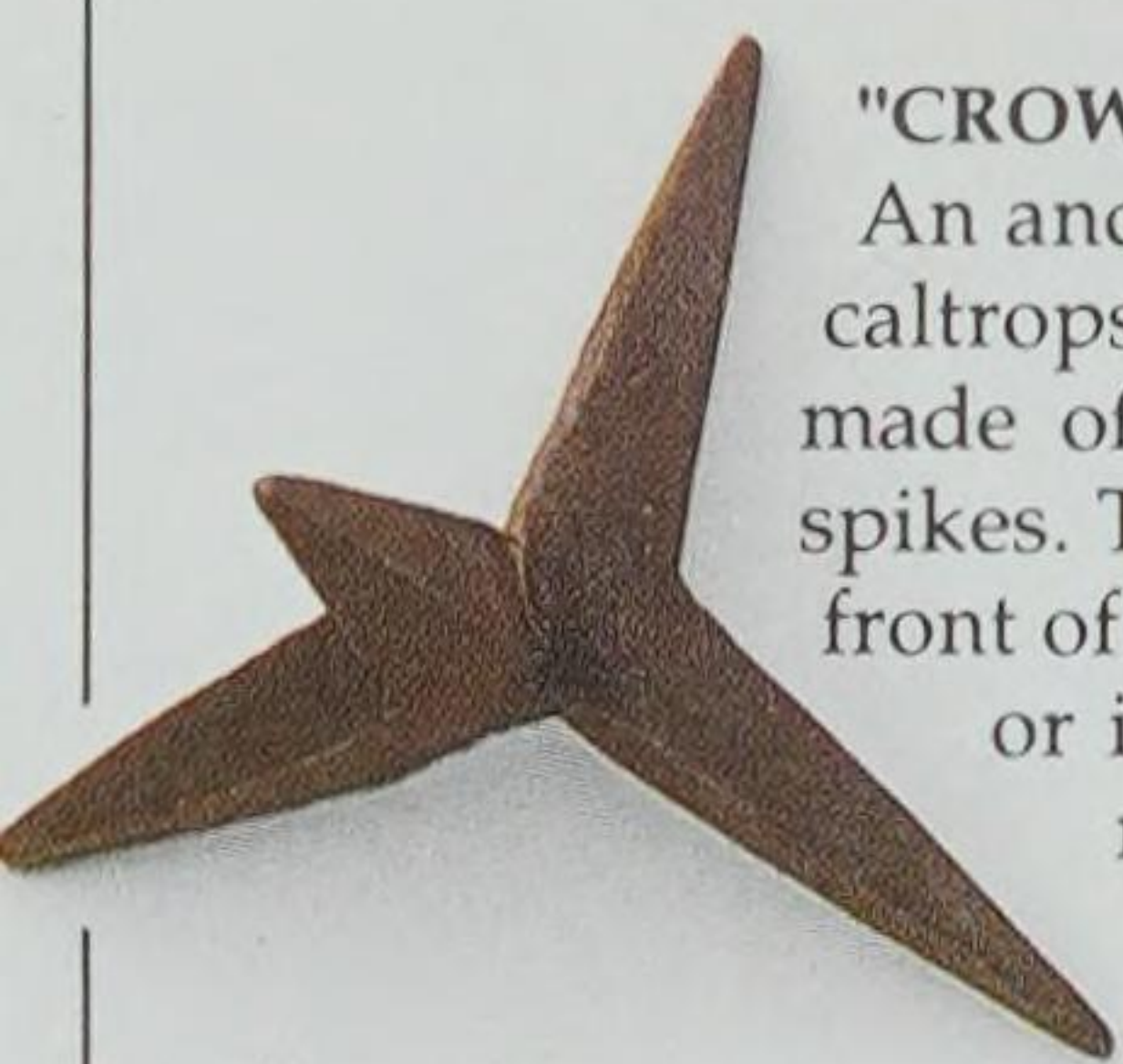
In 1750 two highwaymen robbed Lord Eglinton, who was riding in his post-chaise near London. On this occasion the blunderbuss his lordship is holding proved useless.



# Bizarre handweapons

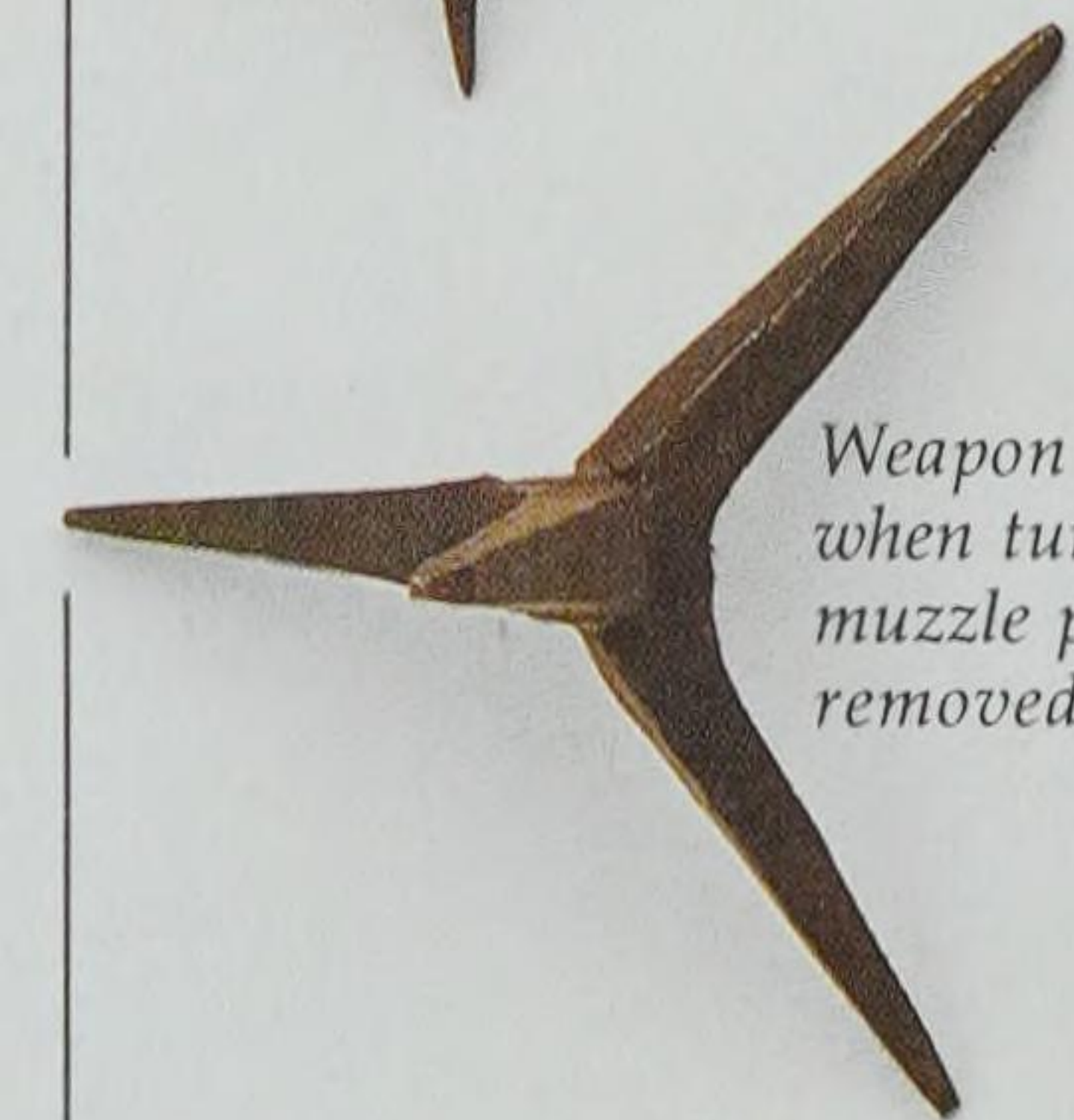


THROUGHOUT recorded history extraordinary and seemingly impractical weapons have been made alongside conventional swords, guns, and bows and arrows. The unusual weapons shown on these pages prove that many local and tribal weapons were just as ingenious and deadly as the specialist weapons devised for close-range attack and defence, or the strange-looking combination pistols made by gunsmiths for their rich customers.



"CROW'S FEET" left

An ancient antipersonnel device, caltrops or "crow's feet" are made of four or more sharp iron spikes. They were strewn in front of horse's hooves or infantrymen's feet.



Weapon fired when turned muzzle plugs removed

Trigger

Barrel concealed in brass handle

## CUTLERY

### PISTOLS right

Among the most impractical flintlock firearms ever devised must be this companion knife and fork, made in Germany about 1740.

## GURKHA KNIFE right

The *kukri* is the national knife and principal weapon of the Gurkhas of Nepal. Although the *kukri* is useful for cutting through jungle, its heavy, curved blade also makes it a deadly fighting weapon.

Single-edged curved blade

## INDIAN MACE right

This all-steel mace was made in India in the 19th century. The owner would have used the mace to lean on whilst he was sitting down but could have quickly clubbed any possible assailant with the metal "hand".



## ITALIAN GUNNER'S STILETTO below

The engraving on the blade of this 18th-century dagger is a numbered scale for artillery commanders to calculate the bore size of cannons.



Engraved blade

## THE LAST ARMOUR below

In the 1700s and 1800s, the only piece of armour regularly worn by European or American infantry was the gorget (p. 26), worn as a mark of rank for officers rather than for defence. Today, gorgets are still used with full dress in some countries. This particular gorget (below) belonged to an officer of the marines in the British navy, c. 1800.

Dagger blade

Gorget





#### APACHE PISTOL right

Around 1900 a gang of Parisian criminals called themselves Apaches after the warlike tribe of North American Indians. The gang used specially made pinfire revolvers which had a folding blade and knuckle-duster butt.

No barrel so pistol could only be fired at point-blank range

6 chambers

Folding dagger

Folding trigger

End of grip inserted into musket muzzle

Knuckle-duster forms butt

Turned ivory grip with picket work

Numbered scale on flat of blade

#### BOY'S SWORD below

In the 18th century, wealthy parents presented special small swords to their sons when they left the nursery and wore breeches for the first time.

Sharp point for thrusting

Miniature version of classic small sword (pp. 44-45)

Made of wrought steel

Originally screwed into short "stick" concealing the blade, making it harmless to lean upon

Scroll handle ending in a lotus flower

#### PLUG BAYONET

Early bayonets, dating from about 1650, were sharp blades inserted in the muzzle of a musket for use as a secondary weapon.

Plug bayonets were replaced by socket bayonets in about 1700 (p. 40).

#### WAR FLAILS left

Adapted from grain-threshing tools, a war flail was used against armour in the Middle Ages. It consisted of a shaft with a chain ending in an iron ball, or a wooden ball or bar studded with spikes.

#### INDIAN STEEL DAGGER

An Indian dagger that forms part of an unusual steel weapon used by Hindu holy men and known as a fakir's crutch. The complete weapon is called a "crutch" because the fakir could lean on it when seated.

#### FAKIR'S HORNS above

This unusual-looking Indian weapon, known as fakir's horns, is a double-ended dagger with horn grips. It was used as a defensive weapon by fakirs, Hindu holy men who were not allowed to carry ordinary weapons.

Steel spikes on end of horns

Lion's head pommel

Blackbuck horns

#### MIDSHIPMAN'S DIRK below

This type of hanger (pp. 16-17) or dirk was worn by young naval officers in the 19th century. As each officer had his own weapon specially made before he joined his ship, these weapons are often highly individualistic.

Ivory grip

Single-edged curved blade



# Grenadiers and cavalry



## FRENCH GRENADIER

Despite his title, the main weapon of this soldier in the French Light Infantry was his flintlock musket.

## GRENADIER'S POUCH AND BELT

An 18th-century English grenadier's pouch decorated with a one-legged grenadier. Grenadiers of this period wore special pointed caps to enable them to throw grenades overarm.

Brass match case

Brush for removing excess gunpowder

Velvet pouch

Grenade

Grenade pouch

Live grenade

Buff leather belt

Single-edged blade

By the time Napoleon Bonaparte was conquering most of Europe, at the beginning of the 1800s, flintlock firearms - muskets, carbines and pistols - had become the chief weapons of armies in both Europe and North America (pp. 40-41). Among the specialist flintlocks were grenade launchers - weapons for destroying defensive works such as doorways and barricades. Originally grenades were used by specially trained troops called grenadiers. But by the 19th century most so-called grenadiers were ordinary infantry corps who used flintlock muskets rather than grenades. In the Napoleonic wars muskets proved such formidable weapons that they often destroyed the effectiveness of mounted troops, who relied more on swords and lances than firearms.



Iron case

Charge hole

Fuse

Early hand grenade

Lighted match

Gunstock

LATE 18TH-CENTURY  
BRITISH ARMY  
PATTERN GRENADE  
THROWER. WEIGHT  
5 KILOS (11 LBS)



**SOLDIER LIGHTING GRENADE** *left*

By the late 1600s small bombs known as hand grenades were commonly used in European battles. Early grenades were hollow iron balls filled with black gunpowder. Holes were bored through the wall of the grenade (below left) and threaded with a short fuse.

**GRENADE LAUNCHER**

This formidable looking weapon, designed to increase the range of grenades, first appeared in the 16th century. Any miscalculation over the lighting of the grenade fuse was liable to cause fatal injuries to the grenadier and anybody nearby.

1 m (39 ins)  
long barrel

**CAVALRY CHARGE**

At the Battle of Waterloo in 1815 a series of classic encounters took place as the French cavalry charged the British infantry squares. While one line of the British square fired a volley, another line reloaded. In this battle, the inability of the French cavalry to break through these squares proved decisive.



Fleur-de-lys

**CAVALRY SWORD**

Late 18th-century French sabre with a brass hilt decorated with a fleur-de-lys, the royal emblem of France. The sword has a single-edged, straight blade.

**BRITISH OFFICER'S SHAKO, EARLY 19TH CENTURY**

Basket hilt  
protects the  
entire hand

Engraving reads Pro Deo  
fide et Patria - "For God,  
Faith and Country"

Napoleon  
Bonaparte  
in 1812

**CUIRASSIER'S SWORD**

French sabre with the gilded brass hilt and slightly curved blade of the type used by cuirassier or heavy cavalry regiments in Napoleon's army.



**OFFICER'S SHAKO**

In the 1800s shakos, stiff peaked caps, were worn in many armies (also top of opposite page).



# Keeping law and order

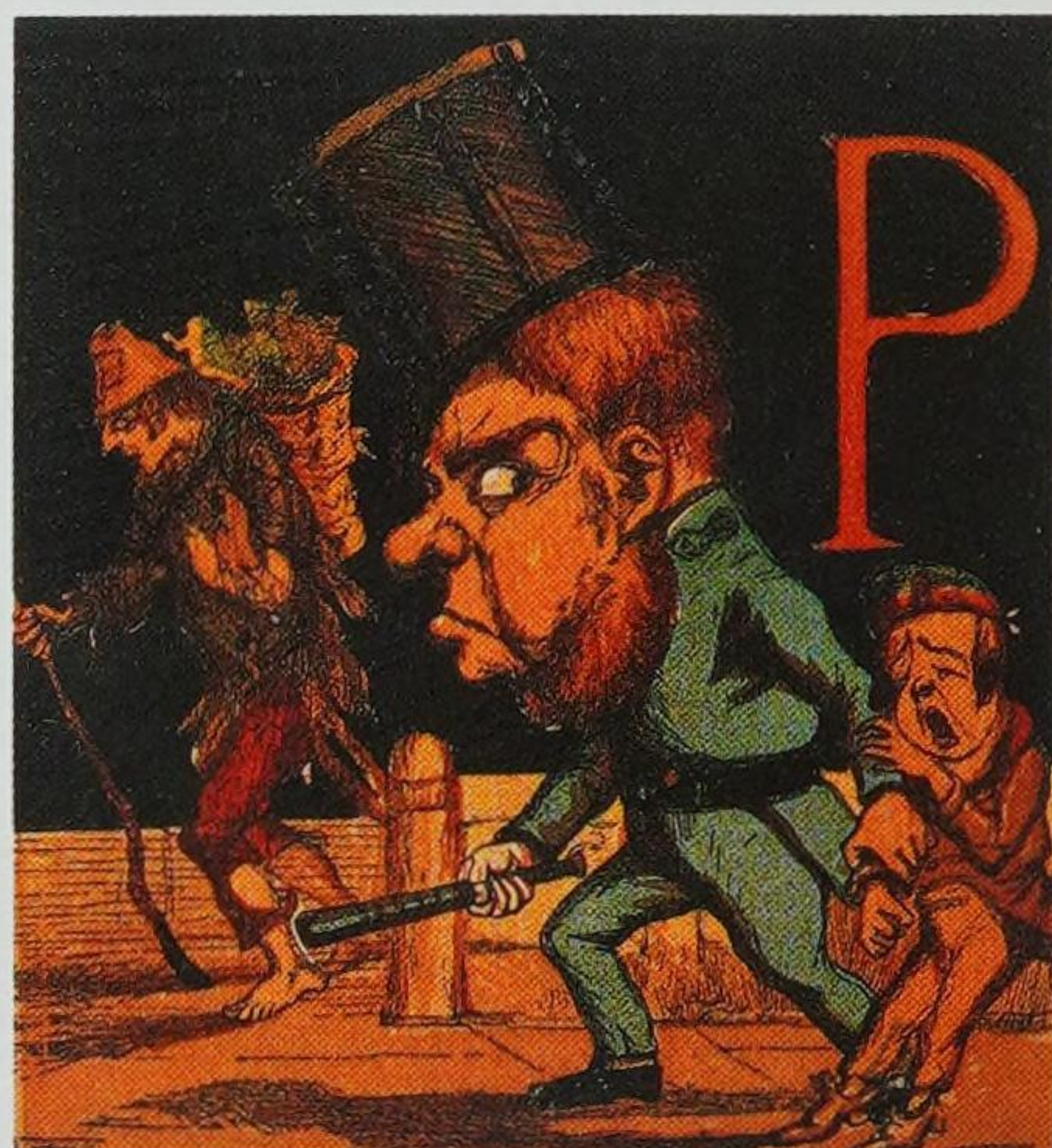


**LONDON POLICEMAN**

A late 19th-century policeman goes on night patrol with just a truncheon and a lamp.

SINCE THE WORD "POLICE" MEANS different types of forces in different countries - civilian and military, uniformed and plain-clothed - the batons, rattles and other law-enforcement equipment shown on these pages are best described as weapons for combatting crime and keeping public order. All of them were in use during the 19th century, and when it is considered how much violent crime and civilian unrest took place during the 1800s, these weapons seem hardly sufficient.

Of course, more powerful weapons were issued to some police forces of necessity - by the late 19th century the Berlin police were armed with swords, pistols and brass knuckles, and the police in American cities such as New York and Boston first used firearms during the 1850s - but in most European and American towns the increasing respect felt for the ordinary civilian law-enforcement officer was due in part to his being so lightly armed.

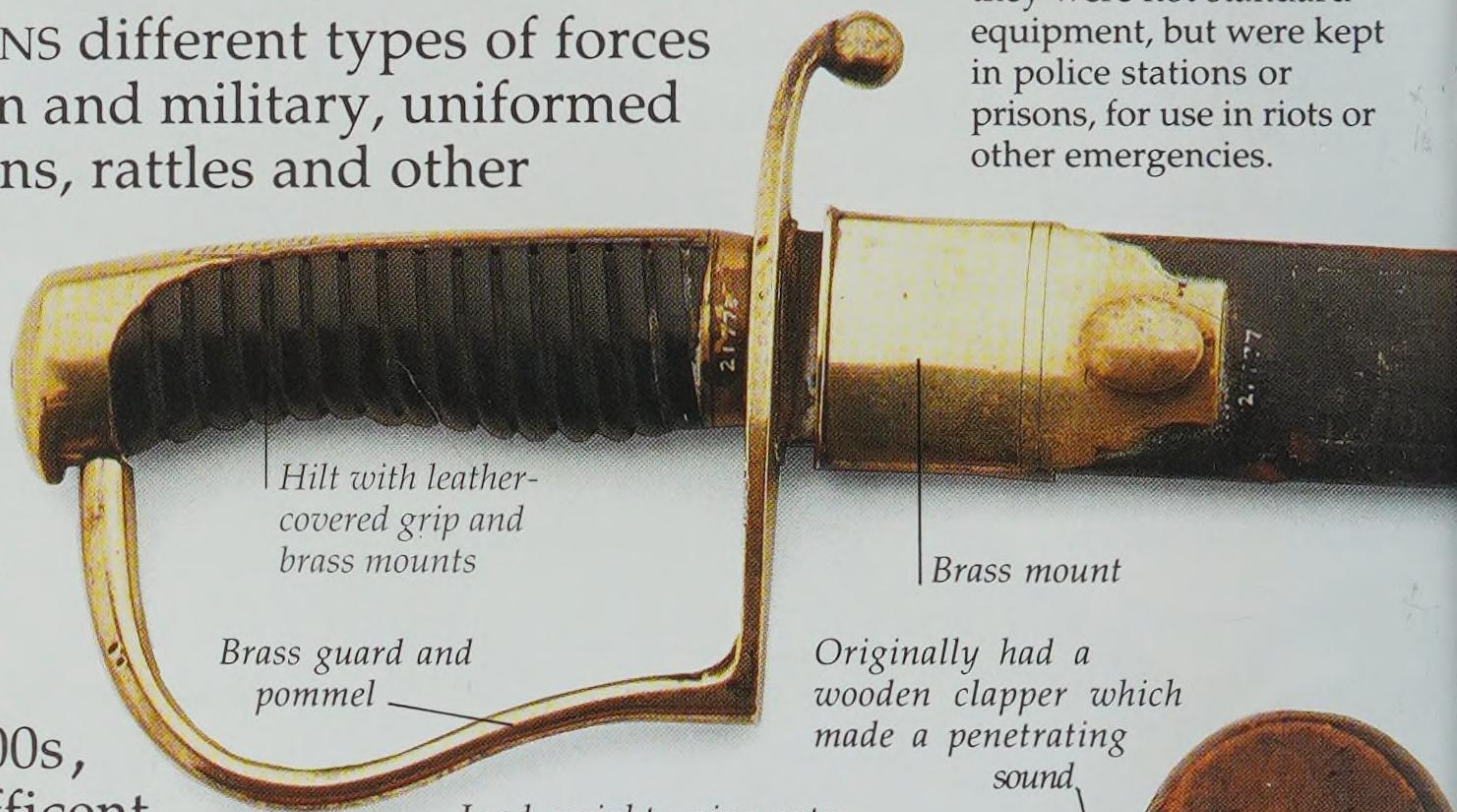


**PICTURE BOOK POLICEMAN**

The fact that images of 19th-century policemen were often used to frighten children into behaving properly is well illustrated by this picture of a policeman in a child's gift book, dating from 1867.

**POLICE WHISTLE** right

Whistles were adopted in many police forces during the 19th century when it was found that they could be heard over far greater distances than the sound from a rattle.



**POLICE SWORD** below  
Short swords were issued to 19th-century police forces and to prison guards. In Britain they were not standard equipment, but were kept in police stations or prisons, for use in riots or other emergencies.

Hilt with leather-covered grip and brass mounts

Brass guard and pommel

Brass mount

Originally had a wooden clapper which made a penetrating sound

Lead weights give extra weight when swung



**POLICE RATTLES**  
Lead weights in a rattle (above) made it a useful weapon as well as giving it extra weight when it was swung. Rattles with clappers (right) made an especially loud noise.



Buckle for securing at the back of neck

**LEATHER COLLAR**

In some early police forces officers wore leather collars called stocks to protect them from being garotted - strangled with a cord. Stocks were both hot and restrictive to wear.

Stock is 10 cm (4 ins) wide

Outer tin shell

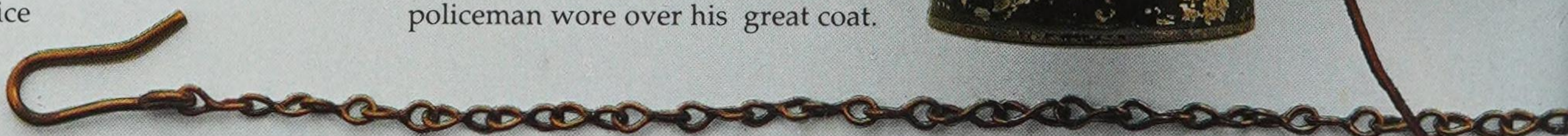
Ground glass magnifying lens



Twin handles

**BULLSEYE LANTERN**

The standard British police lamp in the 19th century, the bullseye lantern hooked onto the belt the policeman wore over his great coat.





Butt

Stock  
and lock

Barrel

#### POACHER'S GUN

Criminals have often adapted weapons in order to commit a particular type of crime. This 18th-century flintlock "fowling piece" has been broken down into three pieces so that it could be hidden by a poacher inside his clothing.

**WOODEN TRUNCHEON** *below*  
Similar to the American night stick, short wooden batons known as truncheons have been carried by British policemen since the 1820s. This truncheon belonged to a City of London court official, c. 1839.

Curved single-edged blade in leather scabbard

#### HANDCUFFS *below*

Replacing the chains and manacles of earlier days, handcuffs were a vital piece of equipment for any 19th-century police officer.

Silver shaft surmounted by crown

City of London coat of arms

#### SERGEANT DE VILLE *right*

A French civilian policeman or *sergent de ville* in 1850. *Sergents de villes* wore blue uniforms and bicorne hats and, like many early police forces, carried short swords as standard equipment.

#### TIPSTAFF, c.1750

This ceremonial club or tipstaff was only carried as a symbol of authority.

#### THE EARLIEST POLICEMEN *below*

The first modern police force was set up in London in 1829 by Sir Robert Peel. These early "peelers" or "bobbies" were mistrusted by the public and often ridiculed by contemporary cartoonists.

#### SINGLE HANDCUFF

This small handcuff was only used for taking a prisoner short distances.

Handle twisted to lock handcuff

Ebony handle

#### PRISON HANDCUFFS

Handcuffs like these were used for moving convicts within prisons.

British police whistle, 1884 model

Key always kept in lock

Tipstaff of a private constable in one of the City of London Companies, c. 1820 (*above*)



# The percussion revolver

PERCUSSION IGNITION WAS A VITAL DEVELOPMENT in the history of firearms. In the early 19th century it offered instantaneous ignition and greatly improved resistance to wet weather. In its most common form a thimble-cap containing detonating compound was placed on a steel nipple. When struck by the weapon's hammer the cap exploded, sending a jet of flame through the nipple into the powder charge. Early percussion guns were still muzzle-loaders (pp. 38-39), with the cap separate from the powder and ball. Later, the cap was incorporated in the base of a self-contained metallic cartridge, with the powder and ball. The metal case sealed in the explosive gases, allowing efficient breech-loading designs that are still in world-wide use today.

## SHERLOCK HOLMES

An actor portraying the most famous detective in literature, Sherlock Holmes, is shown holding a smoking percussion pistol.

## PERCUSSION REVOLVER

A percussion revolver, c.1855, made by the English gunmaker William Tranter. This self-cocking double-action design could be used with one hand. Pulling the lower trigger turned the cylinder and cocked the hammer; pulling the upper trigger fired the shot.

## INDIAN MUTINY, 1857 below

In the kind of hand-to-hand fighting that took place in the Indian Mutiny, British officers preferred self-cocking revolvers (like the Tranter), for rapid firing.

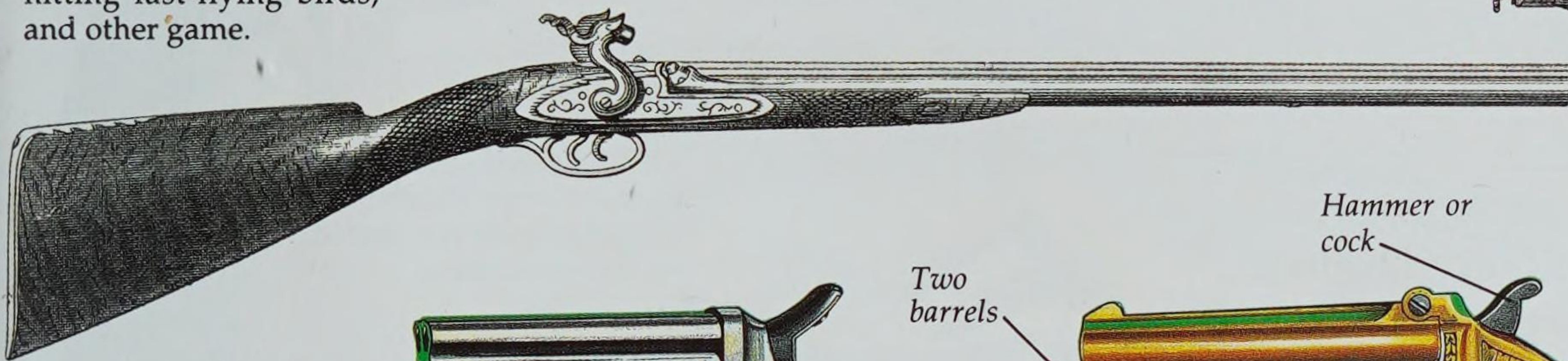
## BAG OF CARTRIDGES

To load the revolver, the copper cover was removed from the paper sachet of powder attached to the bullet, and the cartridge was loaded into the front of the revolving cylinder. The revolver would have been equipped with a detachable rammer.

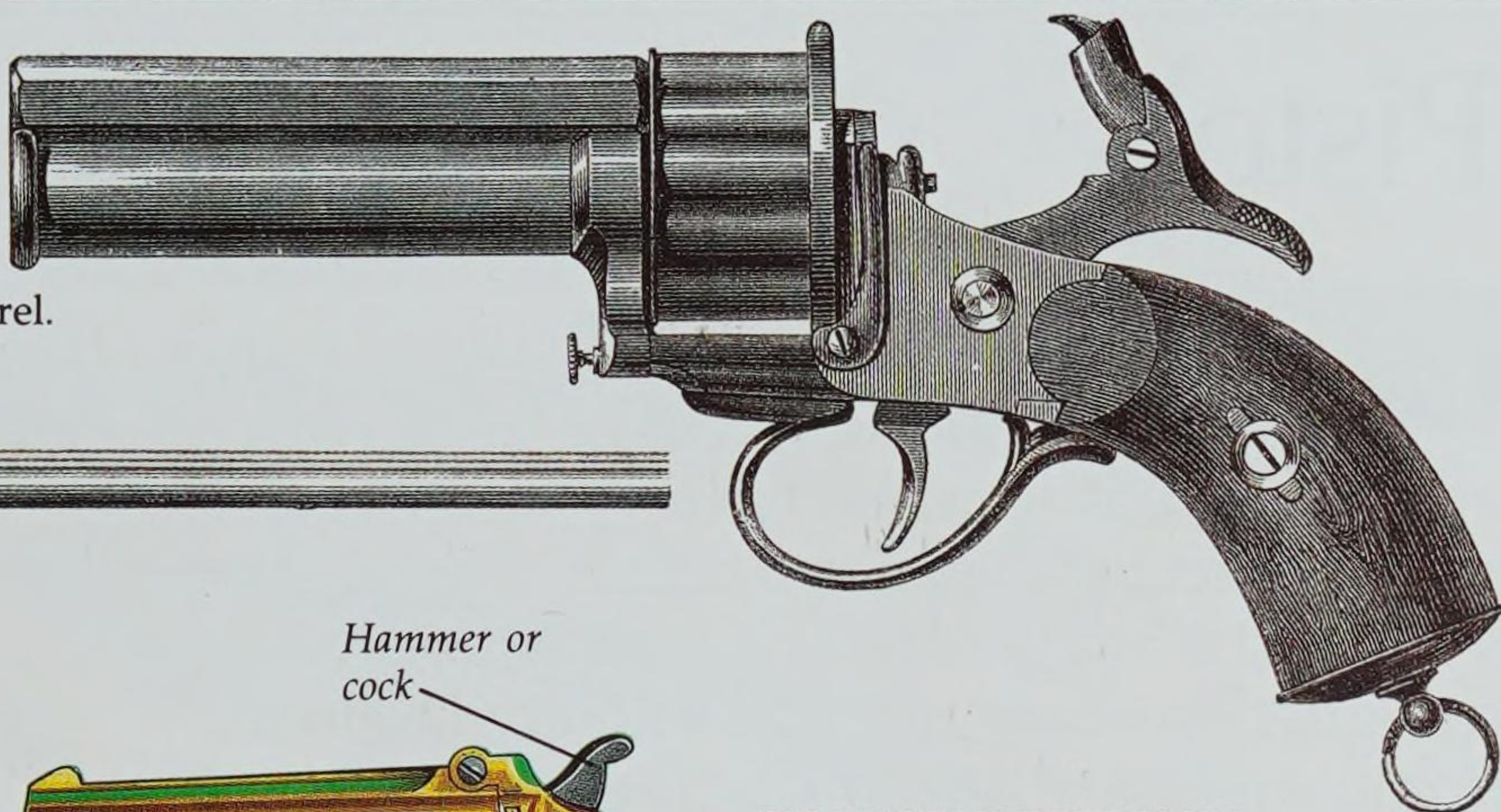




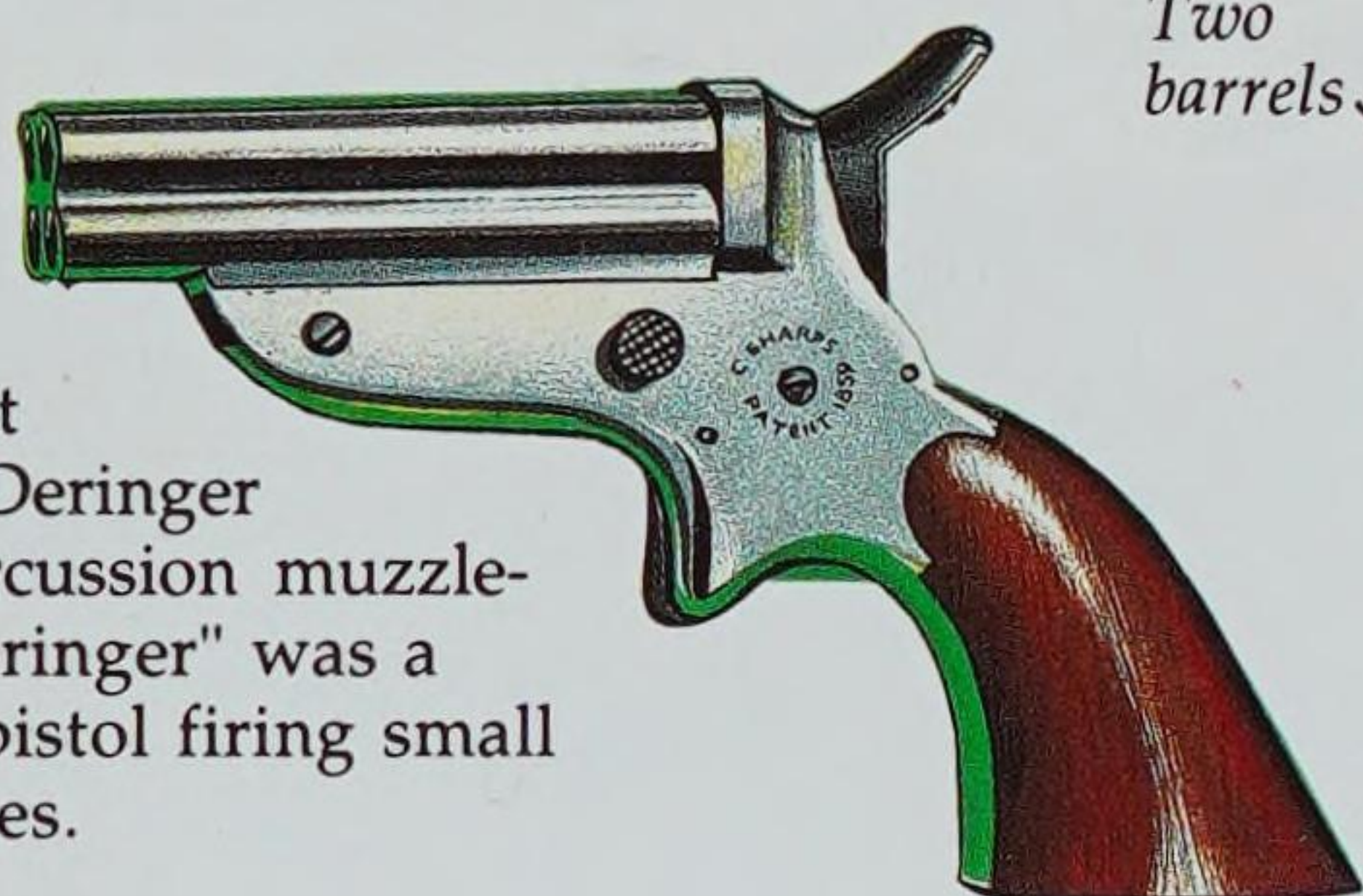
**PERCUSSION SHOTGUN**  
An artist's impression of a percussion shotgun, c.1850. Percussion ignition greatly improved the sportsman's chances of hitting fast-flying birds, and other game.



**LE MAT REVOLVER**  
Invented by a French resident of the USA, this heavy revolver had a cylinder which revolved round a central shotgun barrel.

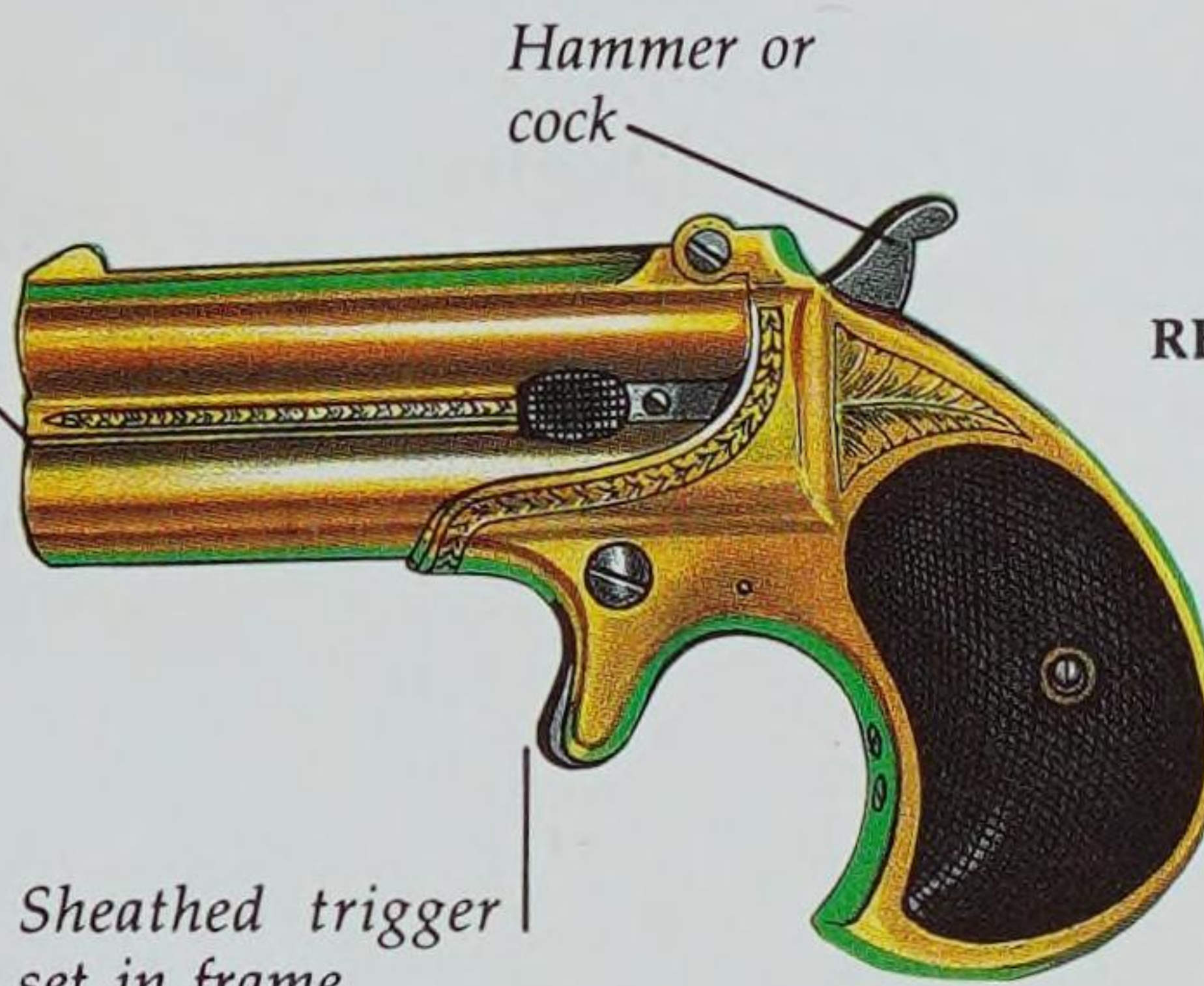


**SHARPS DERRINGER**  
An improvement on the original Deringer which was a percussion muzzle-loader, this "Deringer" was a four-barrelled pistol firing small calibre cartridges.



Gold koftgari decoration added in India

Two barrels



Hammer or cock

Sheathed trigger set in frame

**REMINGTON DERRINGER**  
Another type of pocket pistol modelled on the original percussion Deringer was this two-shot Remington, which fired a metallic cartridge.



Fore sight



Lead bullet with grease in groove and wad at base

**NIPPLE AND WRENCH**  
The nipples, the most vital part of a percussion weapon, were removed by means of the wrench for cleaning. A nipple screwed into the revolver to link the flash of the percussion cap to the propellant.



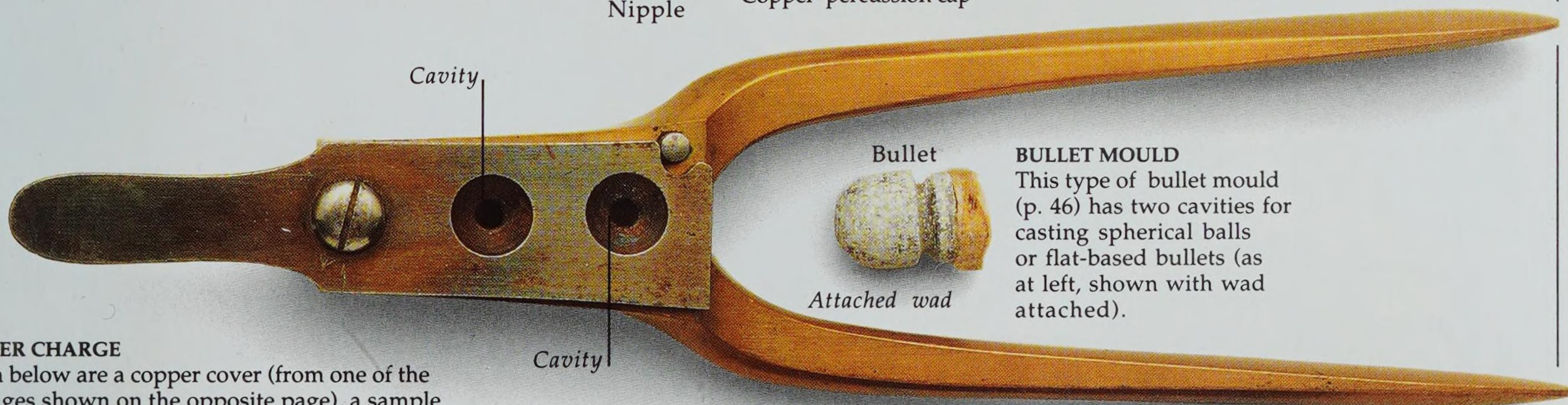
Wrench



Nipple



Copper percussion cap



Cavity

Bullet

**BULLET MOULD**  
This type of bullet mould (p. 46) has two cavities for casting spherical balls or flat-based bullets (as at left, shown with wad attached).

Attached wad

Cavity

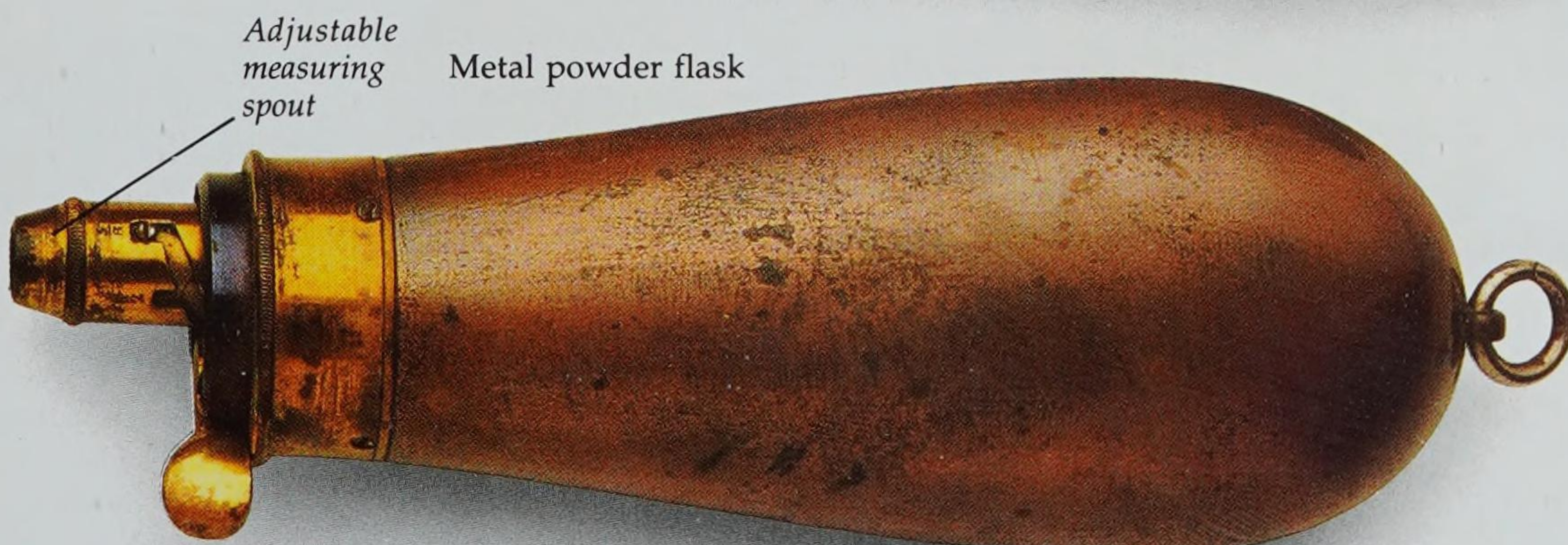
**POWDER CHARGE**  
Shown below are a copper cover (from one of the cartridges shown on the opposite page), a sample of gunpowder, and a powder flask. If cartridges were unavailable, a percussion revolver like the Tranter could be loaded with powder from the flask and a loose bullet. Powder flasks became obsolete when self-contained cartridges arrived.



Cartridge cover



Gunpowder

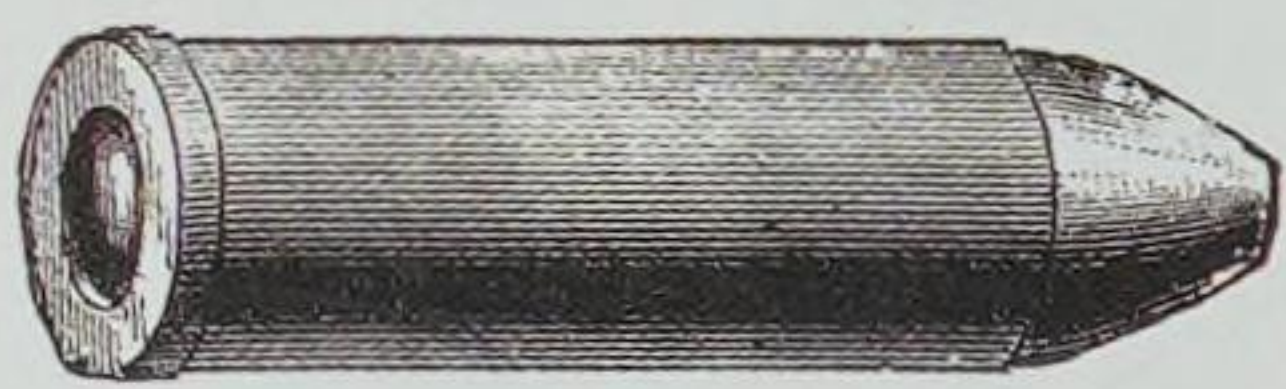


Adjustable measuring spout

Metal powder flask

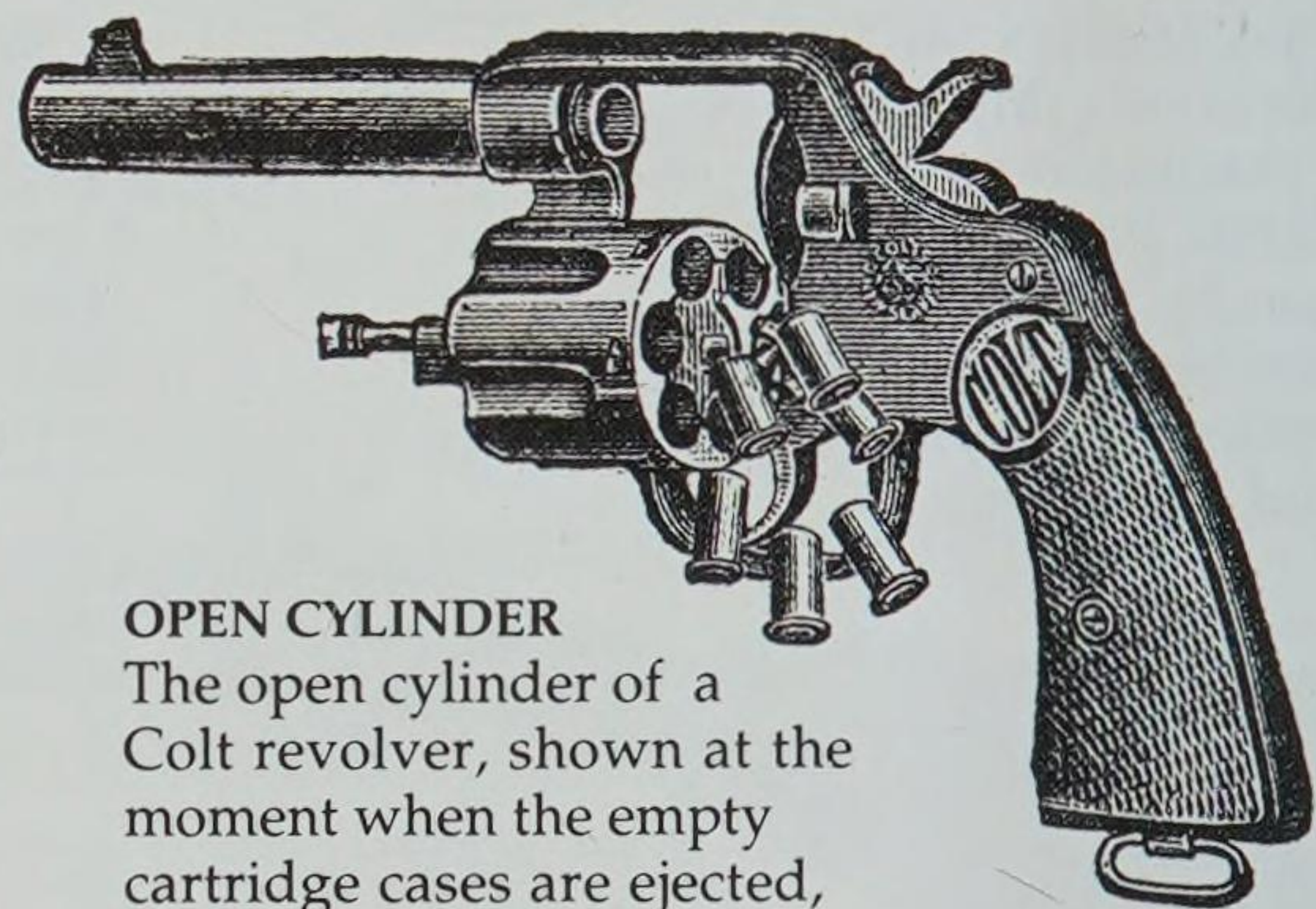


# Pistols



A PISTOL IS SIMPLY a short-barrelled firearm designed to be used with one hand

- a convenient weapon to carry, but needing much practice to fire accurately. During the 19th century a great variety of pistols were designed for both military and civilian use. Some could fire only a single shot but others - called revolvers - could fire a succession of shots before they needed reloading.

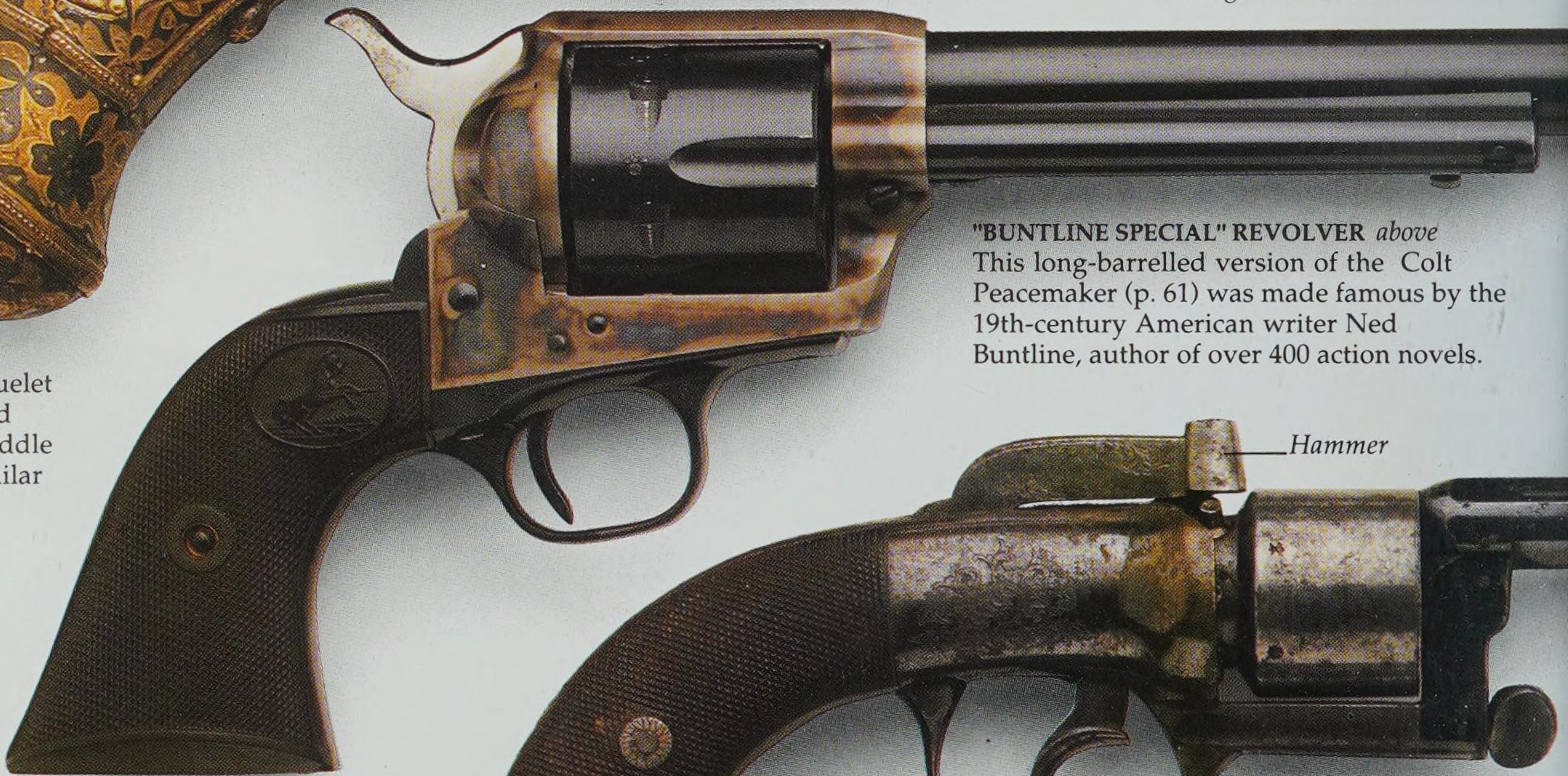


**OPEN CYLINDER**  
The open cylinder of a Colt revolver, shown at the moment when the empty cartridge cases are ejected, before reloading.



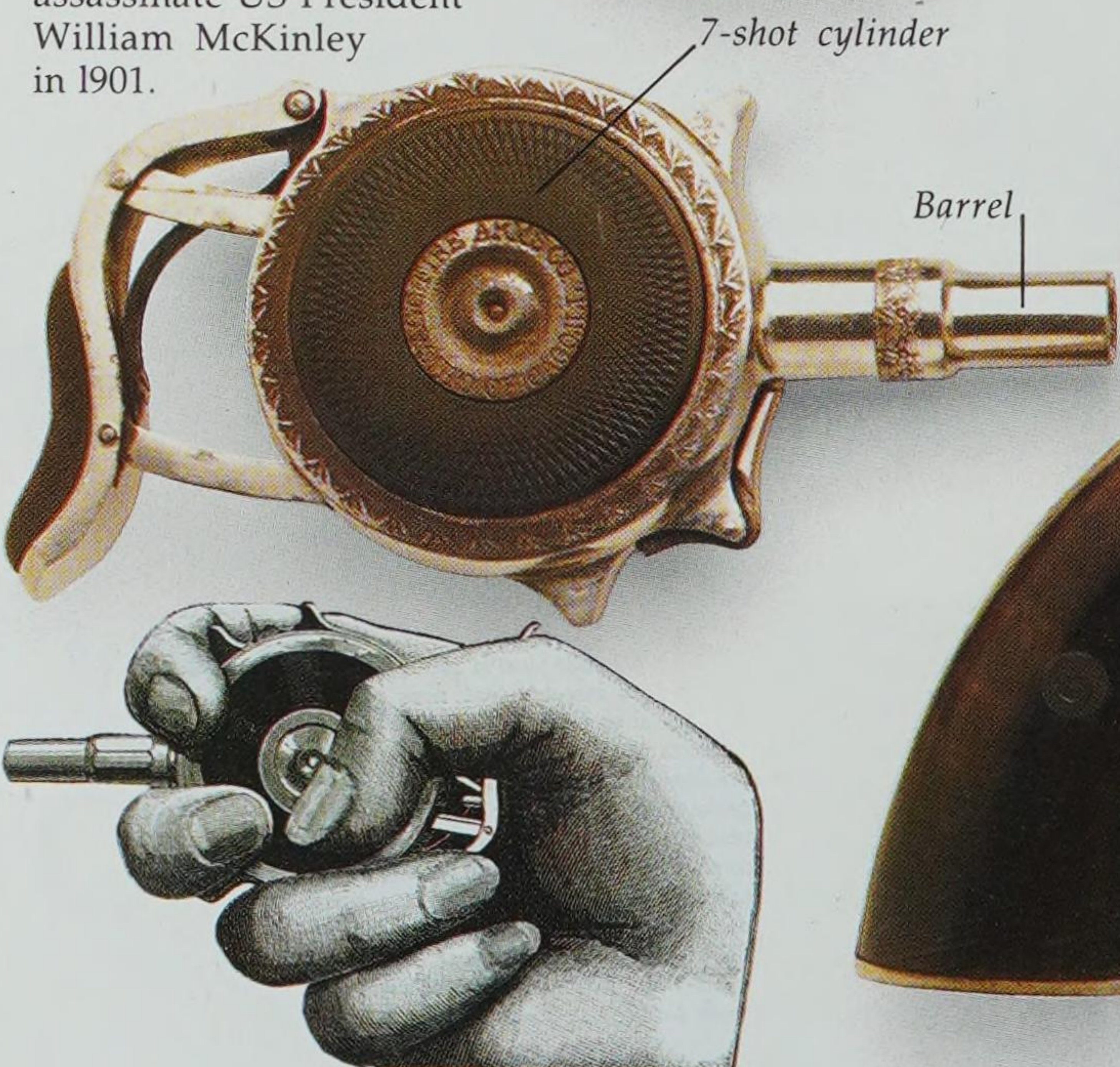
**COSSACK PISTOL**  
A pistol from the Caucasus in southern Russia with a miquelet lock - a type of flintlock used mainly in Spain and the Middle East. The Cossacks used similar pistols in the 18th and 19th century.

One of three bands for holding barrel in stock



**"BUNTLINE SPECIAL" REVOLVER** above  
This long-barrelled version of the Colt Peacemaker (p. 61) was made famous by the 19th-century American writer Ned Buntline, author of over 400 action novels.

**ASSASSIN'S PISTOL** below  
This unusual revolver, known as a palm pistol or "lemon squeezer", was held almost hidden in the hand, and fired by a squeezing action. One was used to assassinate US President William McKinley in 1901.



7-shot cylinder

Barrel



**TRANSITIONAL REVOLVER** above

Representing the "transition" between the pepperbox and the true revolver, this weapon was cheap and popular during the 1850s.

Hammer



Six barrels

Trigger rotates the barrel and fires the shot

**PEPPERBOX REVOLVER**  
The pepperbox was an early form of revolver, with a cluster of barrels, the muzzles of which resembled holes in a pepper-pot. Pepperboxes were popular between 1830 and 1860, despite their unreliability.



Bullet mould for combination pistol

Folding dagger blade

Folding pocket knife blade

Pistol barrel

#### COMBINATION PISTOL

A popular weapon of the 1840s and 50s was the combined pistol and pocket knife. This example includes a pistol, two knife blades, a ramrod, and space in the grip for ammunition.

Folding trigger

Hollow grip for ammunition and bullet mould

Decorated brasswork

Special 12 in (305 mm) barrel

Ramrod

#### POCKET OR MUFF PISTOL

This percussion pistol, c. 1850, was kept in a man's pocket or a lady's muff. Its trigger folded into the pistol when not in use.

#### COLT POLICE REVOLVER

A .36 calibre cartridge for Colt Police Revolver

Among the many types of pistol produced by Colt from the 1830s onwards was the Model 1862 Police Revolver, a gun firing five shots.

Lanyard ring for cord attaching pistol around the neck or shoulder

Ejector rod to knock out empty cartridge cases

#### PINFIRE CARTRIDGE

The pistol's hammer struck the brass pin, which set off a detonator inside the cartridge.

Two barrels

**FRENCH PINFIRE REVOLVER**  
Pinfire weapons were among the first to use a self-contained cartridge in which bullet, powder and cap were all held in a brass case. The cartridge could be loaded quickly from the breech end, and its case stopped the explosion leaking back towards the firer's hand. This revolver dates from about 1855.

**"OVER-AND-UNDER" PISTOL**  
This English pocket pistol, c. 1820, has two barrels, one above the other. Each has its own flintlock mechanism, but a clever design allows both barrels to be fired by just one trigger.

Single trigger

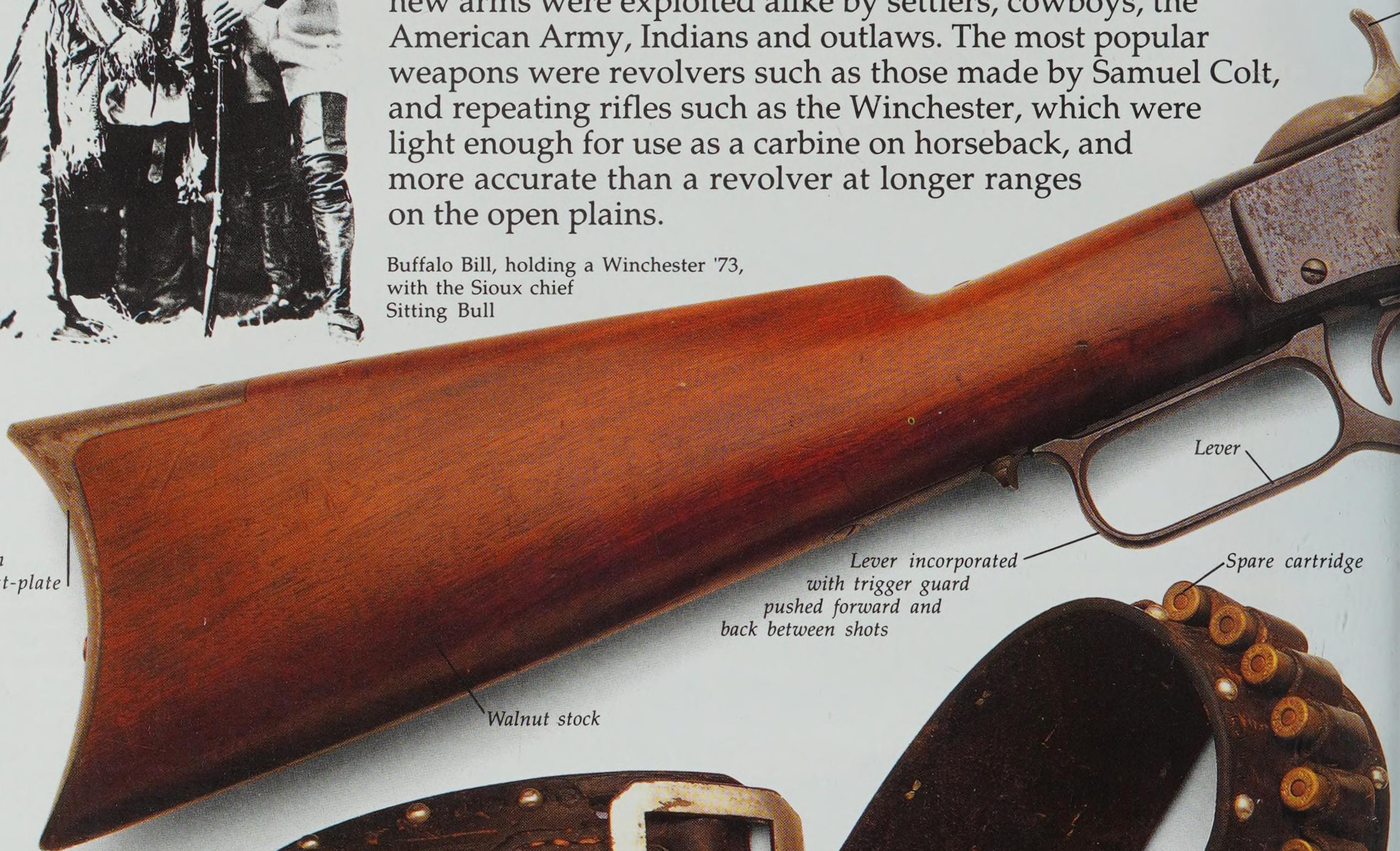




# Guns that won the West

THE WESTWARD EXPANSION of the United States in the 19th century coincided with a period of rapid development in firearms, and the new arms were exploited alike by settlers, cowboys, the American Army, Indians and outlaws. The most popular weapons were revolvers such as those made by Samuel Colt, and repeating rifles such as the Winchester, which were light enough for use as a carbine on horseback, and more accurate than a revolver at longer ranges on the open plains.

Buffalo Bill, holding a Winchester '73, with the Sioux chief Sitting Bull



Iron butt-plate

Lever

Lever incorporated with trigger guard pushed forward and back between shots

Spare cartridge

Walnut stock

Belt loop



**GUNBELT AND HOLSTER**  
This much-used 19th-century gunbelt and holster is similar to the one worn by the US cavalry officer in campaign dress, drawn by Frederic Remington (inset). Note the spare cartridges in the belt loops.





**"A FIGHT IN THE STREET"**  
Remington drew this scene of two men exchanging shots outside a Western saloon for a magazine in 1888.

**WINCHESTER MODEL 1873**  
Often called "the gun that won the West", this is the legendary repeating rifle, the Winchester '73. Cartridges were fed through the loading gate on the side of the action, into the magazine below the barrel. Working the lever between shots ejected the empty case and fed a fresh cartridge into the breech.

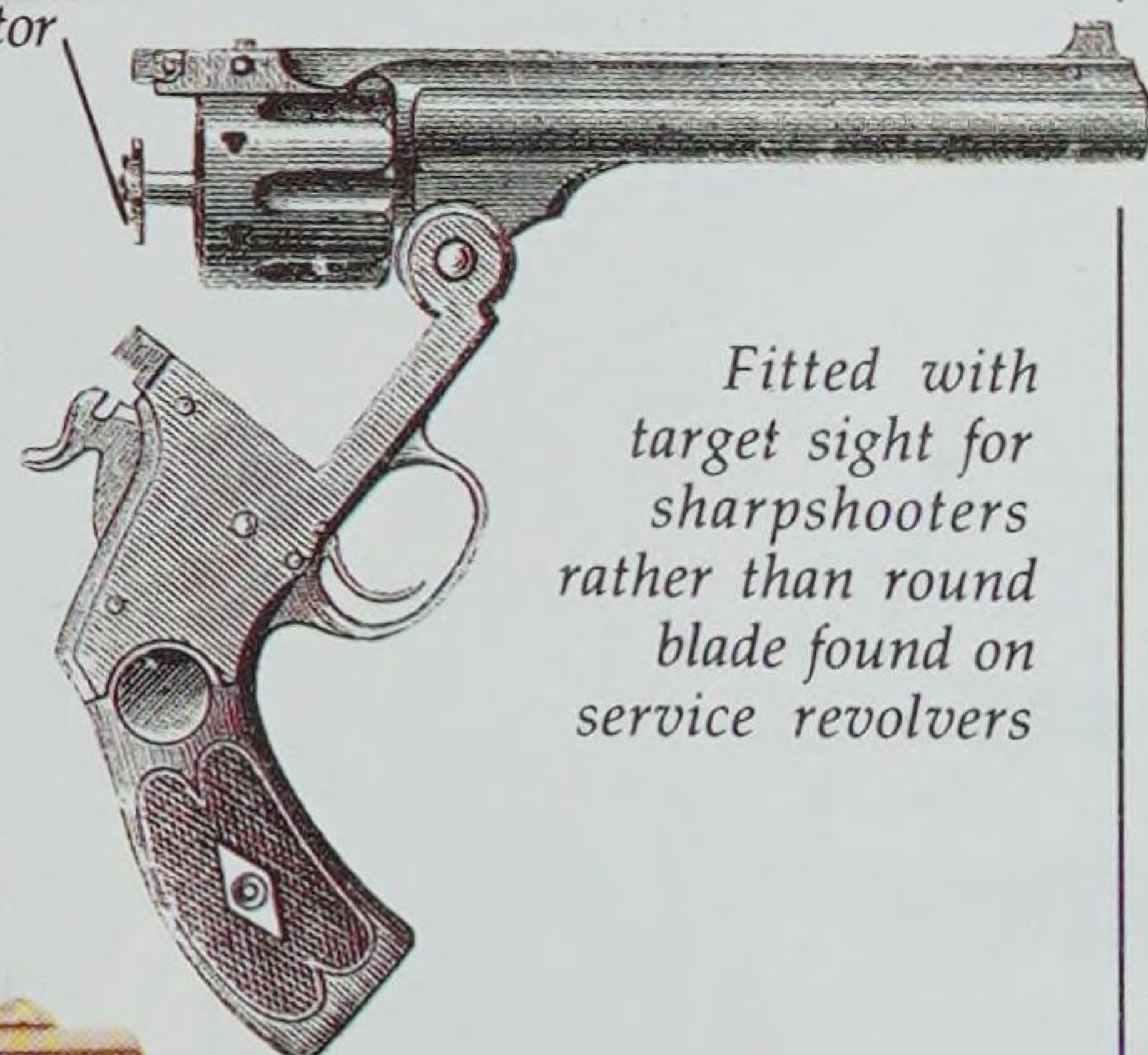


**44-40 CARTRIDGE left**  
Many Winchester rifles and Colt revolvers fired this popular cartridge so that users needed only one type of ammunition. The calibre is .44 inch, and 40 refers to the charge of 40 grains of powder.

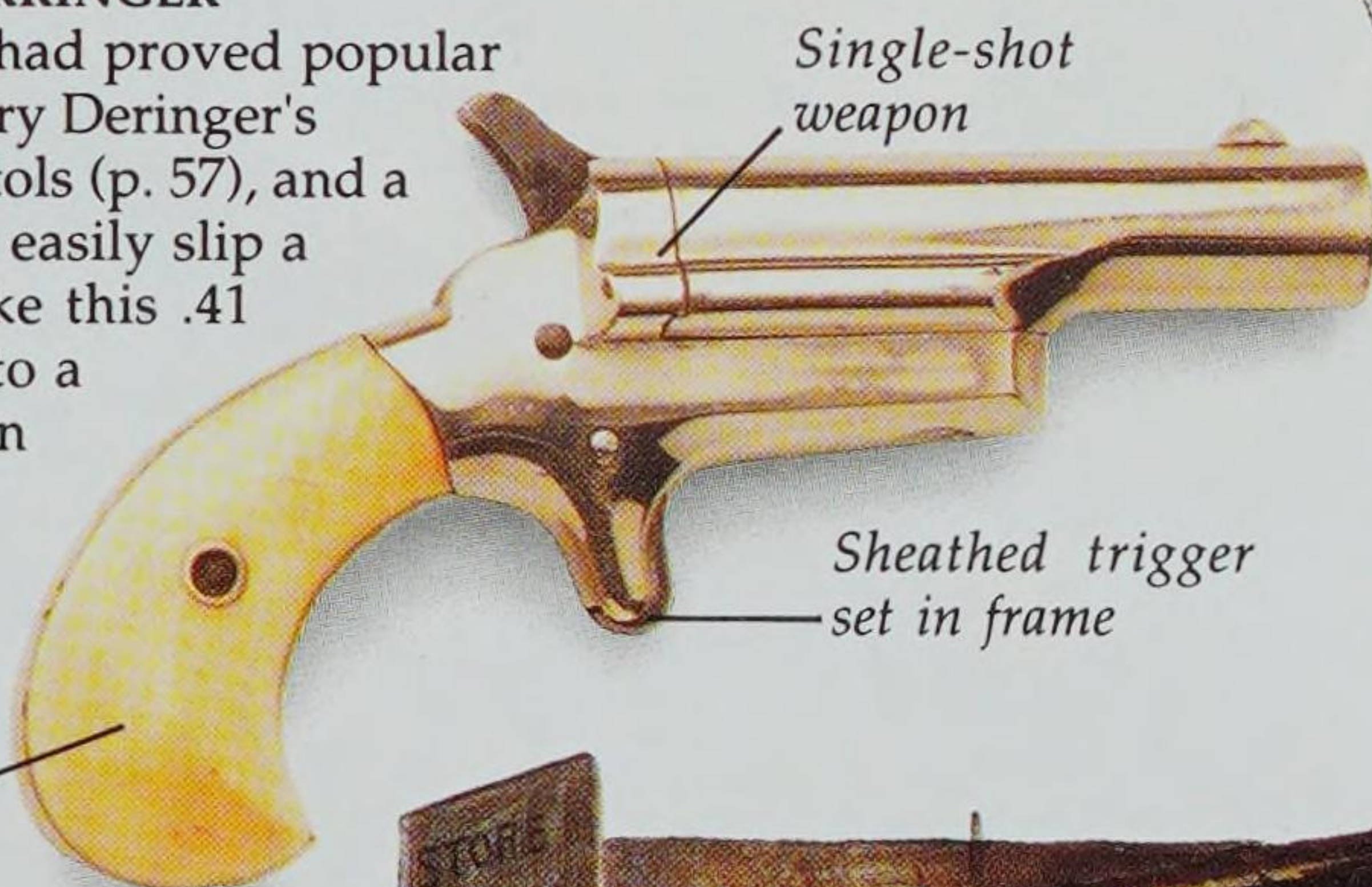


**COLT PEACEMAKER**  
The Colt Single-Action Army revolver, often called the Peacemaker or Frontier revolver, is the most popular gun ever made. This Cavalry model has the longest barrel - 7.5 in (190 mm).

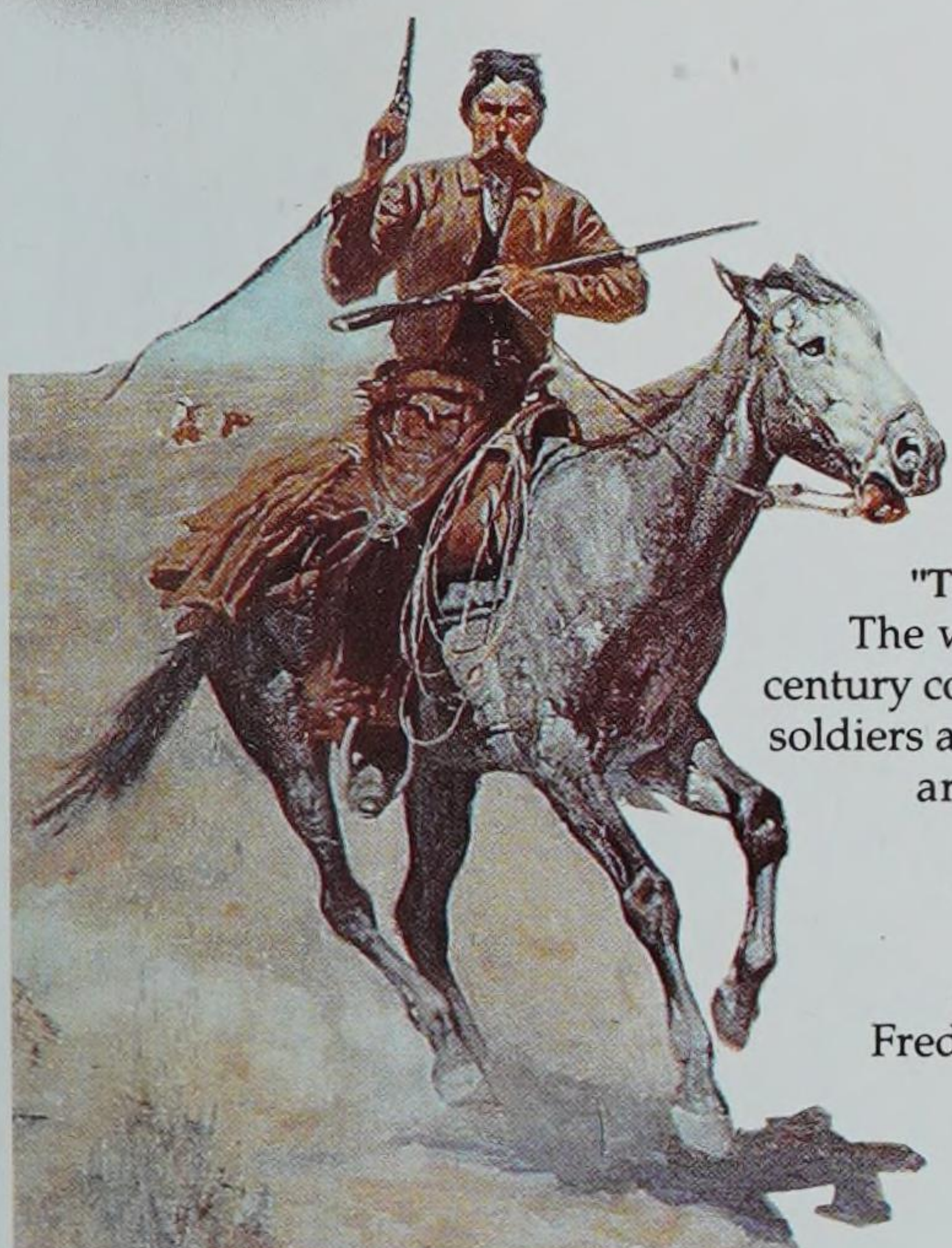
**SMITH AND WESSON REVOLVER right**  
An illustration showing the break-open action of this type of revolver, which automatically ejected the empty cartridge cases when opened.



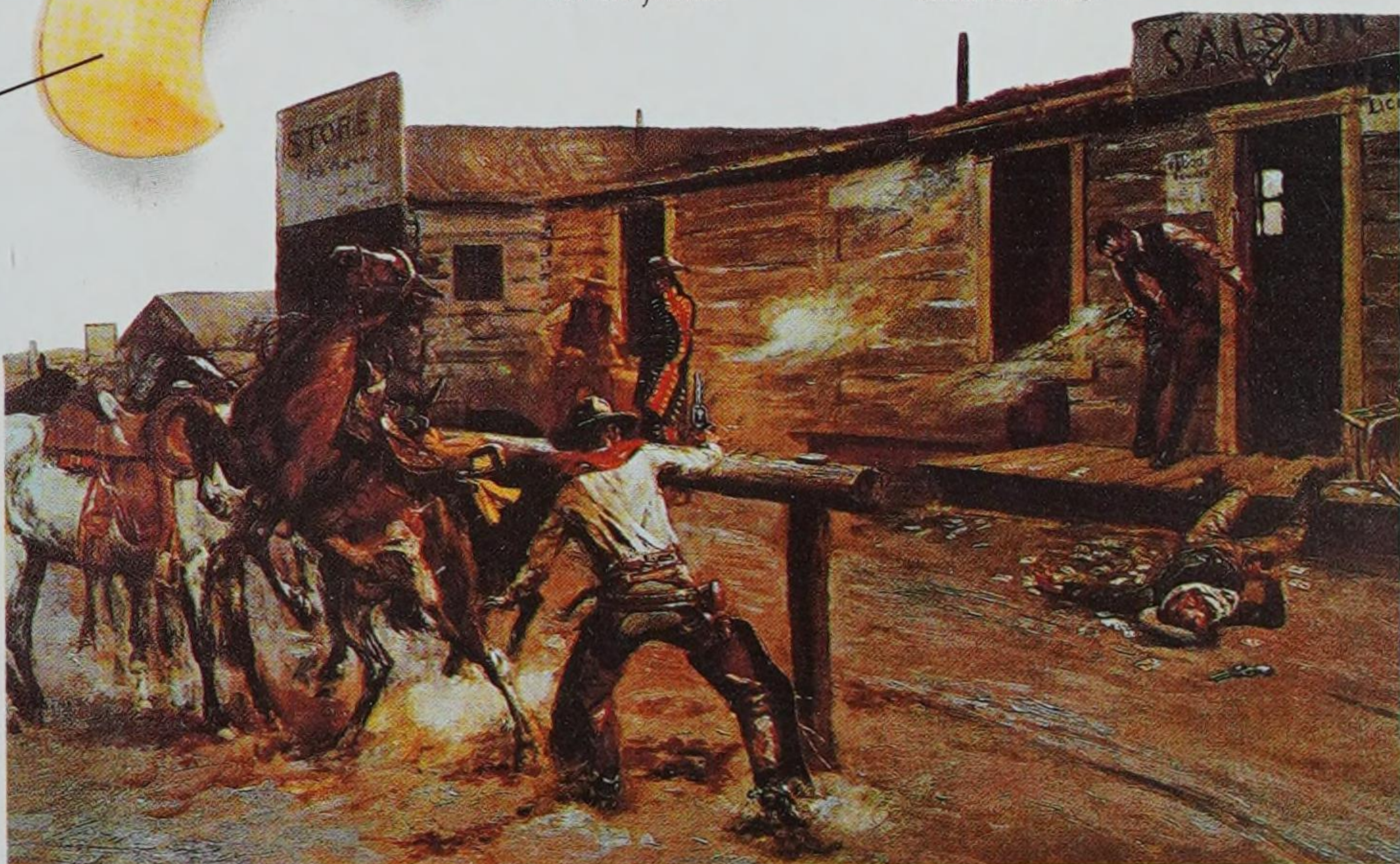
**COLT NO 3 DERRINGER**  
Pocket pistols had proved popular ever since Henry Deringer's percussion pistols (p. 57), and a gambler could easily slip a small pistol like this .41 calibre Colt into a pocket for use in self-defence.



**"GUNFIGHT" below**  
This painting of a gunfight by Charles Russell illustrates the part that Colt revolvers played in Western quarrels and brawls.

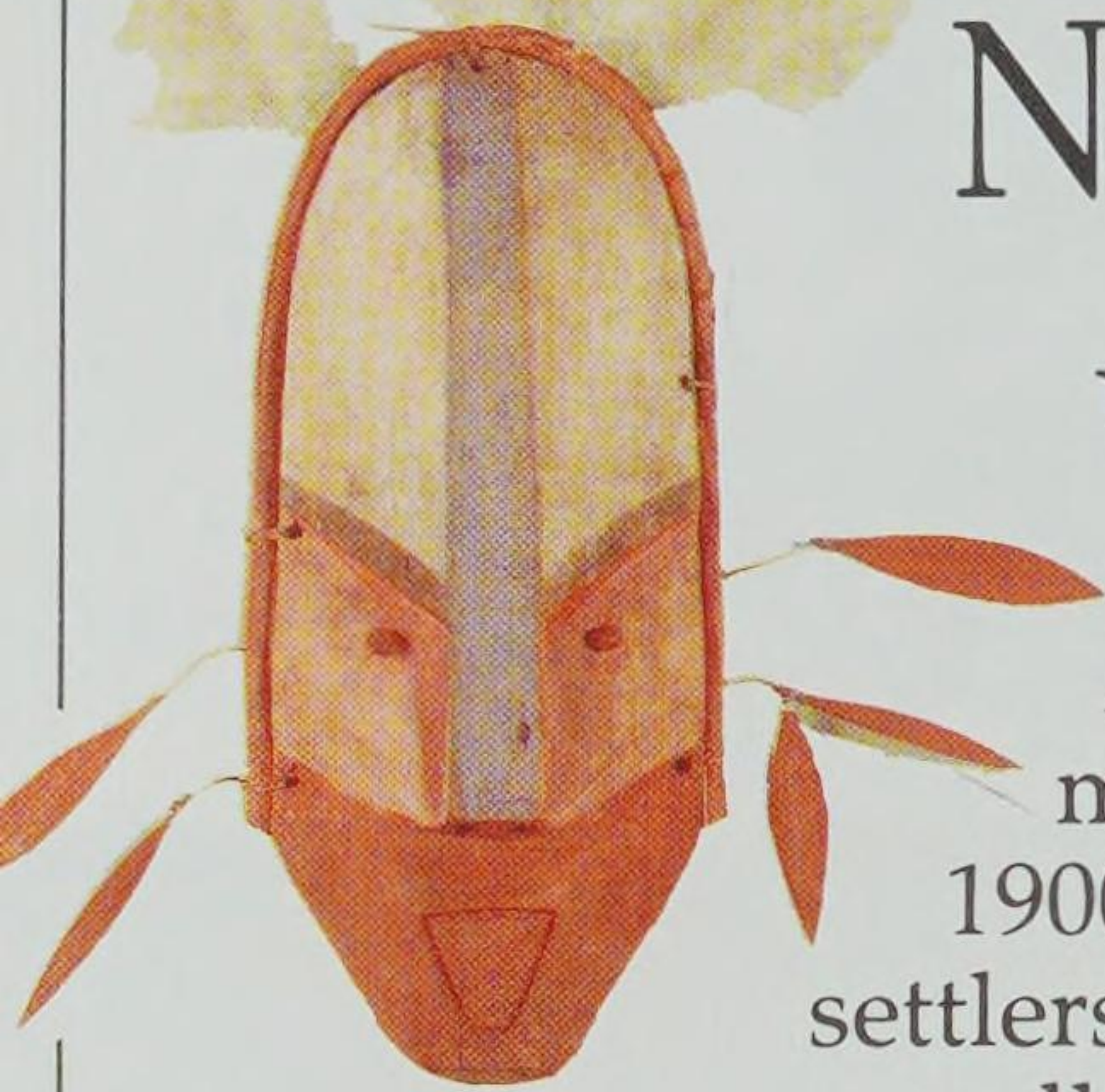


**"THE FLIGHT" left**  
The weapons of 19th-century cowboys, Indians, soldiers and frontiersmen are authentically depicted in the drawings of the contemporary American artist Frederic Remington.





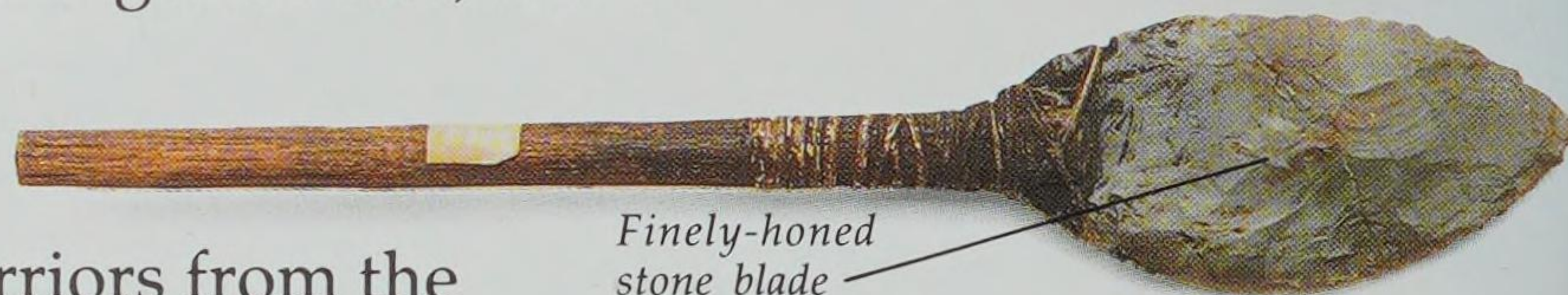
# North American Indians



A typical mask worn by Indians during religious ceremonies

WRONGLY CALLED *Indios* by Christopher Columbus, the native inhabitants of North America once totalled between one and two million people. However, between 1492 and 1900 the Indian tribes were decimated, as European settlers enforced their own way of life on the woodlands and prairies. After initial peaceful contacts with white traders, the tribes who fought hardest to prevent the white man's takeover of their lands in the 1800s, were those who lived on the Great Plains and in the Southwest. The Plains Indians lived in the central grasslands, where the more nomadic tribes among them hunted the great herds of buffalo that crossed the prairies. Other Indian tribes

such as the Apaches, fierce warriors from the Southwest, lived more sedentary lives. Before they obtained European rifles, the tribes in both these areas used basically the same weapons - bows and arrows (p. 9), knives (pp. 22-23), clubs, and the weapon most strongly associated with the North American Indian, the tomahawk.



Finely-honed stone blade

## STONE-BLADED KNIFE

All Indians owned knives - this one was made in 1900 by a Hupa Indian from California. By 1900, many Indians had steel-bladed knives.



## HIAWATHA

An Ojibwa Indian, Hiawatha was the hero of a long narrative poem, written in 1855 by Henry Longfellow. In it, Hiawatha becomes leader of his people, and teaches peace with the white man.

## WAR BOW, c. 1850

Until they began to acquire firearms in the 1850s and 60s, Plains Indians' bows were their most important weapons, used for both hunting and warfare. Made of ash, this bow belonged to a Omaha warrior.



Feather decoration

Cloth strips bound with buckskin

Quiver made of buckskin

Bow made of ash

Nock or groove for attachment of bowstring

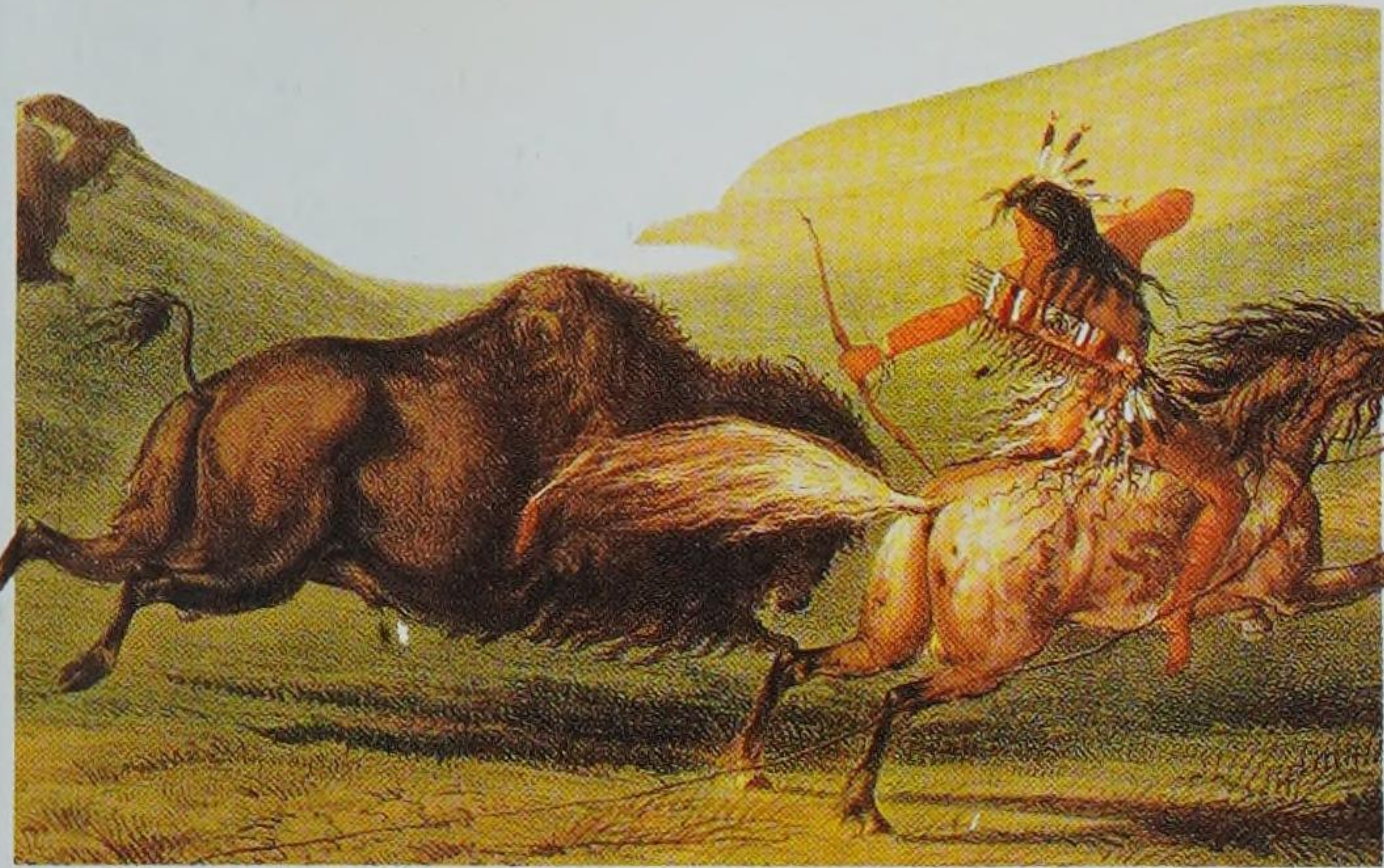
QUIVER

BOW CASE

## BOW CASE AND QUIVER

For easier carrying on horseback, a Plains Indian had a combined quiver and bow case. Bow accessories were usually made of buckskin or deerskin.





**EAGLE FEATHER HEAD-DRESS** left  
The eagle feather head-dress, worn in this photograph of 1907 by Iron Plume, a Plains Indian chieftain, was seen only on ceremonial and celebratory occasions.

Bowstring made of two buffalo sinews twisted together

#### BUFFALO HUNTING

George Catlin spent six years among the Plains Indians, recording their way of life in the early 1800s. In this painting, Indians are involved in their primary hunting task of killing buffalo.

**ARROWS** below  
A Plains Indian's arrow heads would have been made from buffalo bones. In other regions, Indians made stone arrowheads.

#### TOMAHAWK PIPE, c. 1890

This pipe tomahawk was supposedly made by the great Apache chief Geronimo, during his exile in Florida.

Tomahawk blade

Feathered flights

Iron tobacco bowl

Wooden shafts - frequently painted with symbolic designs

Buckskin grip

An Indian with a war club fights another wielding a tomahawk

Engraving, c. 1800, on blade shows Indian threatening a European

Iron tobacco bowl

Hollow handle

#### APACHE TOMAHAWK PIPE

Before European traders supplied the Indians with iron, they made their tomahawk heads with stone. The type of tomahawk that combined an axe blade with a tobacco bowl was usually made by Europeans for trading with the Indians.



# Did you know?

## AMAZING FACTS

Despite modern pictures that show Vikings armed with swords, swords were rare. The most common weapon of the ordinary warrior was a long spear, and professional fighters and chieftains usually fought with huge broad-bladed battle axes.

Wooden haft  
attached here

Viking axe head

Mongol warriors from central Asia were skilled horsemen, and could ride up to 120 km (75 miles) a day and hit a target with a bow and arrow at full gallop.

Mongol archers had whistling arrows for signalling, armour-piercing arrows, and even arrows tipped with a kind of explosive grenade, making them the first warriors to use gunpowder as a weapon.

At one of the largest medieval tournaments ever staged, at Lagny-sur-Marne in France in 1180, more than 3,000 armed and mounted knights fought each other for sport and honour "with no holds barred".

Some jousts were carried out on water in which two teams of rowers propelled their boats towards one another while a knight in each boat's prow tried to knock his opponent off balance with a lance.



Crossbows and longbows at the Battle of Crecy (1346)

The English longbow, with its range, accuracy, and deadly power, was one of the most decisive weapons of the Middle Ages and responsible for the defeat of the French army at Agincourt in 1415, even though English troops were outnumbered by French five to one.

In 1982, 138 preserved longbows were discovered during the excavation of the shipwreck, the *Mary Rose*, and historians discovered that a longbow's draw power was twice that supposed.

It took years of training and strength to use a longbow effectively, so longbow practice was compulsory by law in England for men of fighting age so that they maintained their skills.

If caught, the French would cut two fingers off the right and left hand of a longbowman so he couldn't draw his bow.

Because crossbows were slow to load, crossbowmen sometimes worked in pairs, with one reloading behind a shield (called a pavise) while the other fired.

One of the first soldiers to die in battle from wounds inflicted by a cannon ball was an English soldier at Agincourt, in 1415. However, the invention of firearms did not change war all at once. A mixture of swords and pikes alongside muskets and cannon was used in battle throughout the 16th and 17th centuries.

A common weapon among European peasants for several hundred years was a kind of primitive mace called a Morning Star or Holy Water Sprinkler. This fearsome weapon had an enlarged head made of iron or wood studded with spikes and was fixed to long shaft.

Armour was often blued by controlled heating or left black because it was thought to make it less susceptible to rust.

The groove in a sword blade is sometimes wrongly known as a "blood gutter". The groove, or fuller, lightens the blade.

In the 1500s, Queen Elizabeth I of England ordered that gallants' rapiers (which had become dangerously long) be broken if they exceeded 1 m (3 ft).

Some early matchlock muskets were so heavy they had to be fired from a rest and so, effectively, were like small cannons. At the time, cannons were often given the names of animals or birds and "musket" was the name used by falconers for the male sparrow hawk – the smallest hawk.

Some sword-fighters carried a special weapon in their left hand. This had a serrated edge designed to catch the opponent's rapier blade, which could then be broken with a twist of the wrist.



Mongol archers

After the invention of the wheel-lock, it was possible to make small, easily concealed pistols. Pistols were fitted into the hilt of swords, onto clubs, spears, and crossbows, and even in the handles of knives and forks. Pistols were also combined with other weapons, such as a daggers and knuckledusters.



Breastplate left black from the forging process



# QUESTIONS AND ANSWERS



Knight in plate battle armour

**Q** Could a knight in plate armour get up if he fell down on the battlefield?

**A** A full suit of plate armour weighed around 20–25 kg (44–55 lb). However, its weight was spread over the body, so a fit man could run, lie down, get up, and mount a horse unaided. Stories of cranes being used to winch a knight into his saddle are therefore untrue. The secret of a knight's mobility was in the way in which armourers made the plates, which were hinged so that they could move with each other and with the wearer.

**Q** Did children wear armour?

**A** In Europe, although a boy of noble birth usually started his training to become a knight from the age of seven, he would not have the money for good-quality armour until he had served his apprenticeship as a squire and had become a knight. This usually happened around the age of 21. However, some rich families did give their young sons gifts of armour. In Japan, ceremonial swords were often given to children when they first put on grown-up or ceremonial clothes.

**Q** Did animals wear armour?

**A** In battles during the Middle Ages, knights sometimes covered their horses' heads and flanks with mail to protect them as they fought. Plate horse armour was expensive, so usually, if a knight could only afford part of it, he chose the shaffron – the piece for the head. Similarly, hunting dogs were usually protected against injury from the tusks of wild boars or stag antlers in quilted, padded vests or, occasionally, in plate and mail. Animal armour was also used in countries outside Europe. For example, in India, elephants used in battle were often kitted out with protective head and body armour.

Horse armour of the Fulani people of West Africa, was made of cotton stuffed with kapok.

**Q** Do people wear armour today?

**A** Yes, but although some soldiers wear shiny metal breastplates and carry swords or spears on parade, on the battlefield they wear a type of flak jacket or bulletproof vest and carry guns. Riot police also wear a kind of flak jacket and a protective steel or plastic helmet with a shatterproof visor. Flak jackets are fitted with metal, plastic, or ceramic materials designed to withstand the impact of most types of hand gun and some rifle bullets, so the wearer is bruised rather than seriously injured or killed.

French policeman in riot gear



Armoured elephant

**Q** What was the first European firearm?

**A** No one knows for sure. However, a manuscript written in England in 1326 called the *Milemete Manuscript* shows an illustration of a knight igniting a powder charge in a small cannon shaped like a vase.

**Q** How were lead bullets made?

**A** In the 18th century, the lead ball or bullet used in flint-lock duelling pistols was made at home, using a special mould. Molten lead was poured into the mould, which was then opened like a pair of scissors when cooled. Excess lead was trimmed off with shears.

## Record Breakers

### FIRST BOW AND ARROW

We know from cave paintings that bows and arrows were made and used in the Sahara region of northern Africa from around 30,000 B.C.

### LONGEST BOW

The powerful English longbow used from the 13th to 16th centuries was usually as tall as its user. With it, an archer could shoot an arrow up to 300 m (1,000 ft). Some Japanese war bows made of a combination of bamboo and other wood were even longer.

### FIRST SWORD

The earliest swords were made in about 1500 B.C., when bronze-working first developed.

### LONGEST SWORD

Two-hand swords (large versions of the ordinary sword, swung in both hands) became popular in the 13th century. Some specimens in museums are nearly 2m (6 ft) long.

### INVENTION OF GUNPOWDER

The first known recipe for gunpowder was published in 1044 by Chinese chemist Wu Ching Tsao Yao and used in fireworks.

### LARGEST GUN

The early musket was the largest gun carried and fired by a single man – some early ones were said to be around 1.2 m (4 ft) long and have a 2.5 cm (1 in) bore.

Bronze sword





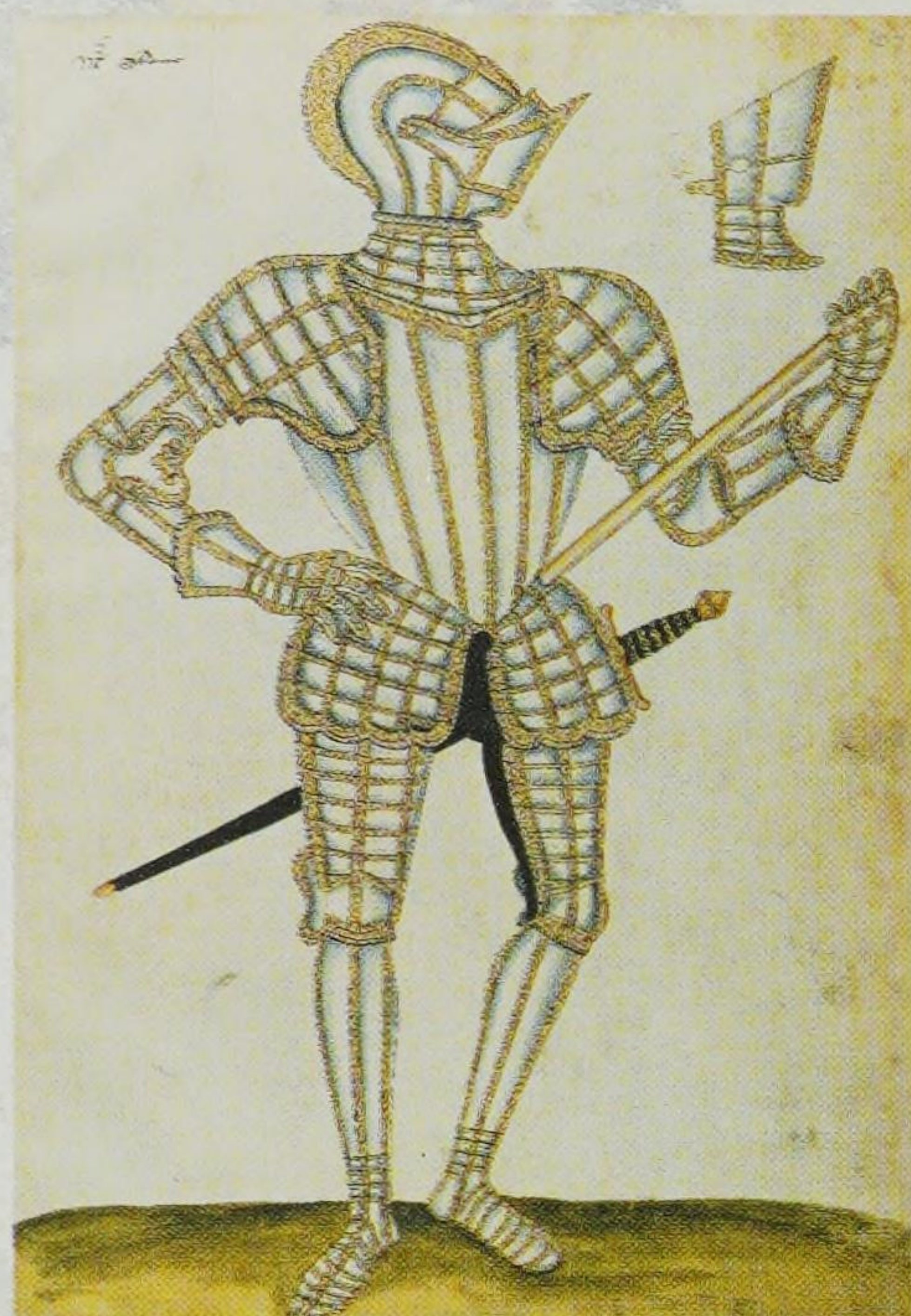
# Who's who?

WE KNOW LITTLE ABOUT THE SKILLED CRAFTSMEN who made early arms and armour and some famous swordmakers, such as Masamune, rarely signed their work. Later, however, names were engraved on pieces, or they were stamped as a sign of workmanship and quality.

## ARMOURERS AND SWORDMAKERS

### MIOCHIN SCHOOL (1100–c.1750)

School of Japanese armourers founded in the 12th century by Munesake, famous for its armour and tsuba. Later generations certified work by the school's predecessors that had previously been unsigned.



Armour design by Jacobe Halder

### MASAMUNE (c.1265–1358)

Famous Japanese swordmaker of Kamakura, who rarely signed or decorated his sword blades, believing (as did many Japanese swordsmiths) that a fine-quality blade spoke for itself and did not need the maker's mark to prove its worth.

### MISSAGLIA FAMILY (FROM c.1390)

Family of armourers working in Milan, Italy, which later assumed the family name of Negrone; became famous for highly decorated, elaborate armour.

### SEUSENHOFER BROTHERS (c. 1459–1519)

Court armourers to Emperor Maximilian I. Conrad Seusenhofer developed the style of fluted armour known as Maximilian armour.

### HANS GRUNEWALT (LATE 1400s)

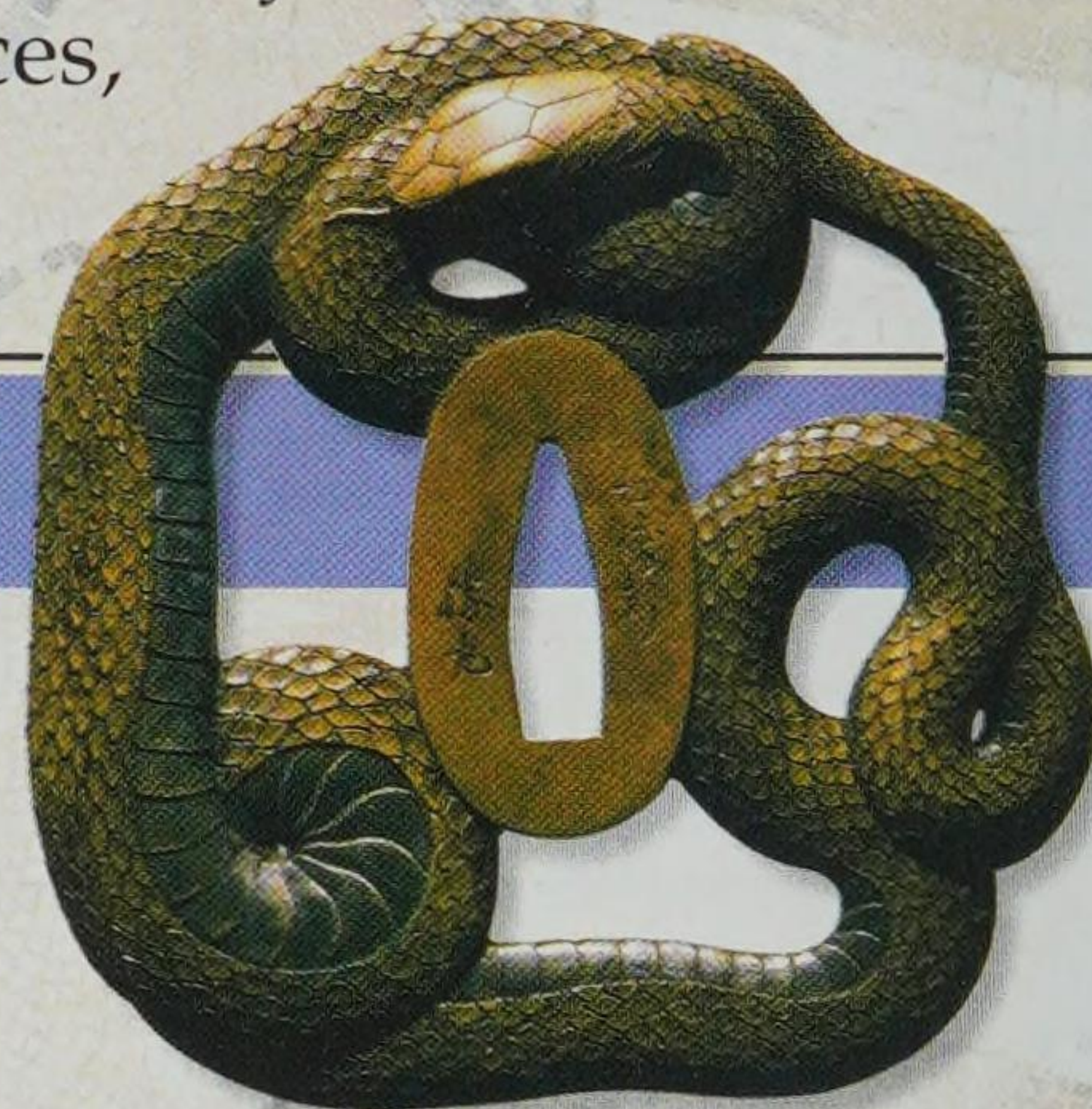
Nuremberg armourer who worked for Emperor Maximilian I.

### COLOMAN OR COLMAN (1476–1522)

Augsburg armourer who produced armour for Emperors Maximilian I and Charles V.

### TREYTZ FAMILY (c.1460–1517)

Family of armourers working in Innsbruck, Austria.



Tsuba

### NOBUIYE (1485–1564)

Japanese maker of tsuba and armour.

### HOPFER BROTHERS (EARLY 1500s)

Augsburg engravers who decorated much of the armour made by Colman.

### JACOB TOPF (1530–97)

Innsbruck armourer who worked for a time at Greenwich, England.

### ANDREA FERRARA (1550–1583)

Italian swordsmith whose blades became popular in Scotland; the famed Highland broadswords are often named after him. Another Italian swordmaker, Giandonato, may have been his brother.

### JACOBE HALDER (1578–1610)

Master armourer at Greenwich Armoury, England.

### ASSAD ULLAH (c.1588–1628)

Persian swordsmith whose blades were made of finely watered steel.

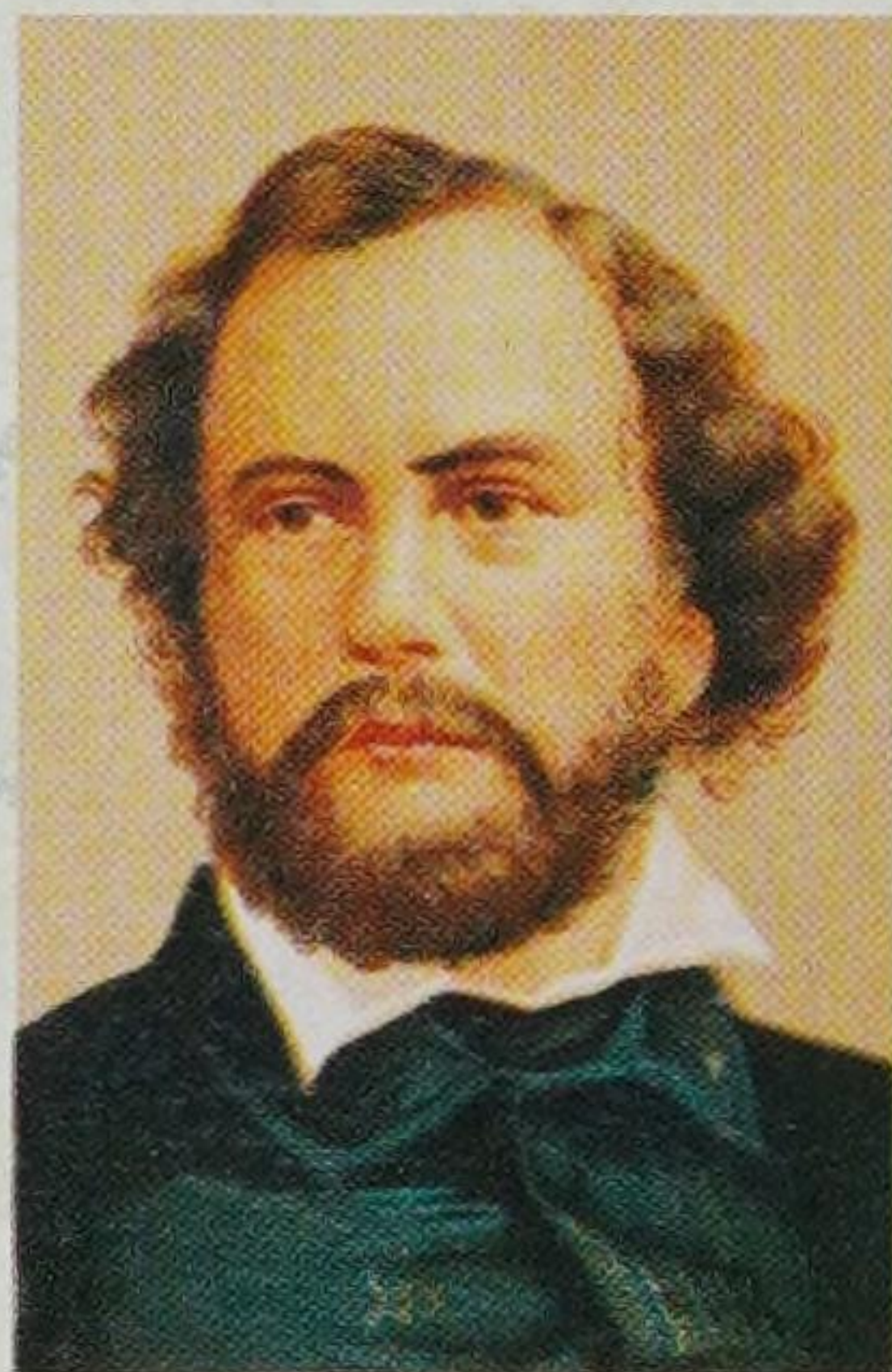
## GUNMAKERS

### HENRY DERRINGER (1786–1868)

American arms maker famous for his distinctive small percussion pistol.

### NIKOLAUS VON DREYSE (1787–1867)

German gunsmith who designed a rifle in which bullets were loaded near the trigger, so troops could shoot lying down, safer from enemy fire.



Samuel Colt

### SAMUEL COLT (1814–82)

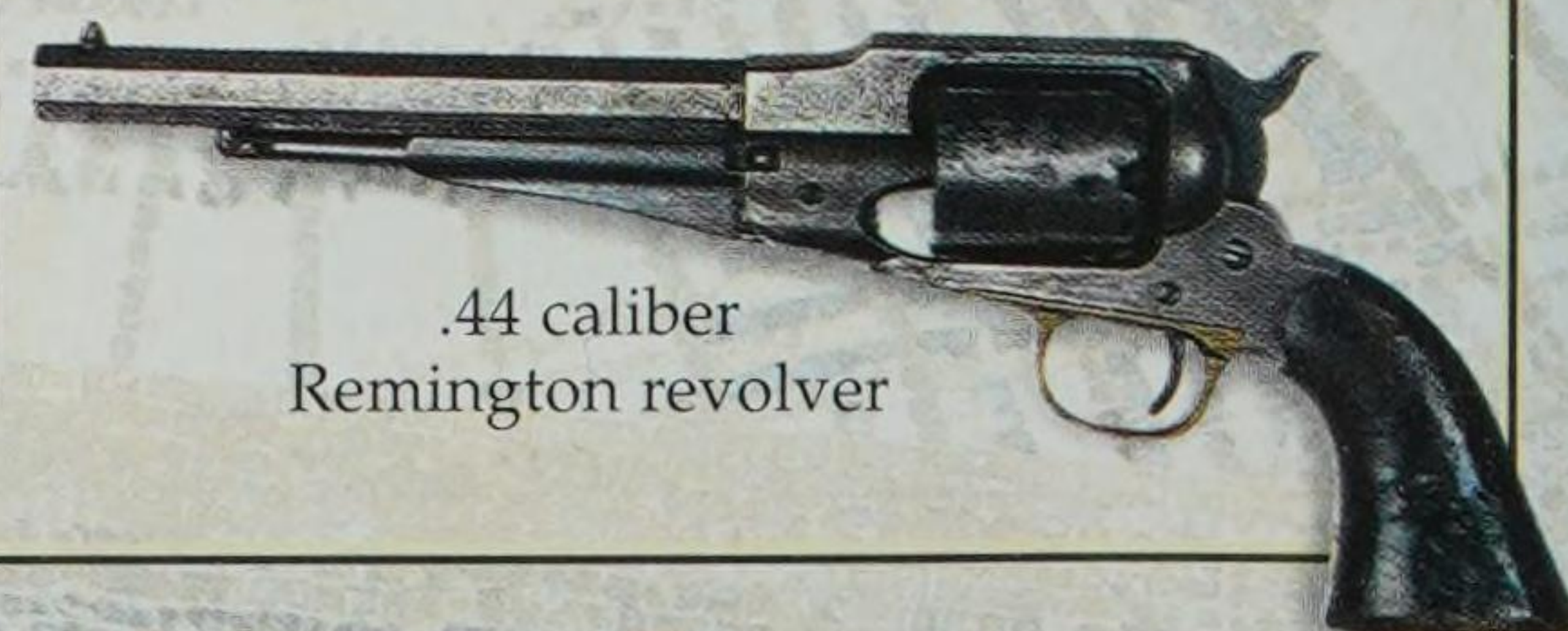
American inventor who took out his first patent for a revolver in 1836; maker of several famous models, such as the Colt 45 and the Colt Peacemaker, which is still in use today.

### OLIVER WINCHESTER

Former shirt-manufacturer with an interest in firearms who founded the Winchester Repeating Arms Company of Connecticut, in 1866.

### PHILO REMINGTON (1816–89)

American inventor and the son of the inventor Eliphalet Remington who ran a small arms factory. Managed the factory's mechanical department becoming president in 1860; perfected the Remington breech-loading rifle.



.44 caliber  
Remington revolver



# RULERS, SOLDIERS AND HEROES

## JULIUS CAESAR (c.100–44 B.C.)

Roman general and statesman whose military campaigns extended Roman power in western Europe. Caesar invaded Britain in 54 and 55 B.C., and also defeated the Gauls.



Alexander the Great

## ALEXANDER THE GREAT (356–323 B.C.)

Son of Philip II of Macedon and tutored by Aristotle, Alexander ascended the throne as King of Macedonia when he was less than 20 years old. During his reign, he conquered Persia, took control of Egypt and founded the city of Alexandria.

## KING ARTHUR (c. 6TH CENTURY)

Legendary king of the Britains represented as a unifier of the British tribes and champion of Christianity, who is said to have wielded the mythical sword, *Excalibur*.

## CHARLEMAGNE (742–814)

King of the Franks who defeated the Saxons, fought the Arabs in Spain, and took control of most of western Europe. He was crowned Roman Emperor in 800 by the Pope.



Charlemagne

## ALFRED THE GREAT (849–99)

King of Wessex, England, who won back land from the Danes, organizing his forces into a standing army and establishing a network of burhs, or fortified centres, so enabling his successors to secure the unity of England.

## WILLIAM I, "THE CONQUEROR" (c.1028–87)

Duke of Normandy and the first Norman King of England who defeated and killed the English king Harold II at the Battle of Hastings in 1066 and replaced Anglo-Saxon leaders with a new ruling class of Normans.

## ROBIN HOOD (c.1250–c.1350)

Legendary English outlaw and hero, said to be unrivalled with a bow and quarter-staff, who lived in Sherwood Forest with his band of "Merry Men", said to rob from the rich and give to the poor.

## WILLIAM TELL (c.1300s)

Legendary Swiss patriot and famous marksman; his killing of the local Austrian steward who had forced him to shoot an apple from his son's head is said to have initiated the movement that secured Switzerland's independence from Austria.

## EDWARD, "THE BLACK PRINCE" (1330–76)

Son of Edward III and a great soldier; who fought at the Battle of Crecy (1346) when still a teenager; he is thought to have gained his popular title from his black surcoat, worn when jousting.

## HENRY V (1387–1422)

King of England who invaded France in 1415 and won the Battle of Agincourt against great odds, mainly owing to the skill of his longbowmen.

## MAXIMILIAN I (1459–1519)

Hapsburg ruler who became Holy Roman Emperor in 1493. His aggressive foreign policy brought him into conflict with the French, Swiss, and Germans. A style of armour with ridges to imitate pleated clothes worn at the time is named after him, although he does not appear to have been connected with it.

## HENRY III (1551–89)

King of France from 1574–89, whose reign was marked by civil war between the Huguenots and Catholics; the last of the French Valois kings.

## NAPOLEON BONAPARTE (1769–1821)

French artillery officer who became Emperor of France in 1804. Defeated by the British navy at Trafalgar (1805), but dominated Europe after a series of victories on land; forced to abdicate when France was invaded, he regained power but was finally defeated at Waterloo (1815).

## DUKE OF WELLINGTON (1769–1852)

British general who was made a duke after his victories against France during the Peninsular War.

Along with Prussian forces led by Blücher, defeated the French at the Battle of Waterloo in 1815.



## GEBBARD LEBERECHT VON BLÜCHER (1742–1819)

Napoleon Prussian field marshal who defeated Napoleon Bonaparte at the Battle of Leipzig (1814) then again at Waterloo (1815); known as "Marshal Forward" because his victories were mainly due to the energy and dash of his troops.

## JAMES BOWIE (1790–1836)

American pioneer born in Kentucky and the inventor of the dagger, or sheath-knife, named after him. Settled in Texas and became a colonel in the Texan army; killed at the battle of the Alamo in 1836.

## WILLIAM FREDERICK CODY (1846–1917)

American army scout and pony express rider; earned the nickname "Buffalo Bill" after killing 5,000 buffalo as part of a contract to supply railroad workers with meat.



Maximilian armour





**SEE A FILM**  
Some films, such as *Gladiator* (above) or *Braveheart* show fairly realistic weaponry and armour from different periods. Props for these films are made by armourers, and it is possible to visit their workshops on the internet.

# Find out more

BECAUSE MOST ARMOUR AND WEAPONRY is made of metal, much has survived through the years and it is possible to see suits of armour, swords, maces, and other weapons in various museums around the world. Many re-enactment groups also put on displays to show what warfare was like hundreds of years ago, with members wearing realistic armour and carrying replica arms. You can often see armour and weaponry from earlier periods in history at state ceremonies or on ceremonial occasions, such as that worn by the Swiss Guards at the Vatican City in Rome (pictured below left).

Walnut stock inlaid with engraved staghorn



## MUSEUM COLLECTIONS

Most national museums contain impressive displays of arms and armour. For example, the Metropolitan Museum of Art in New York, USA, has around 15,000 objects in its collection of arms and armour, including examples from Japan, the Middle East, India, and China. The Musée de l'Armée in Paris contains France's national armour collection and includes many pieces from the 16th century and the Napoleonic era. Some private collections are also open to the public, such as the Wallace Collection in London. It is also possible to see armour on display at castles or stately homes.



## ARMOURIES

Some of the world's great armouries – in Vienna, Madrid, Paris, Dresden, and London – have extensive collections where you can see a range of body armour and weapons. The display pictured above shows arms and armour from the 15th to 17th centuries, which is housed in the War Gallery at the Royal Armouries Museum in Leeds, England.

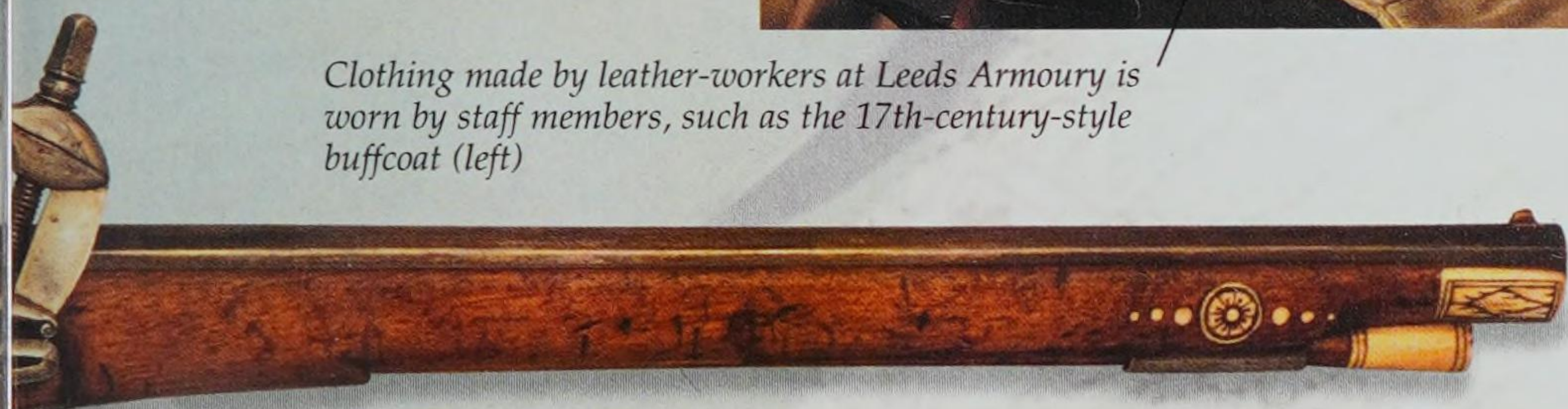


## DEMONSTRATIONS

The Royal Armouries at the Tower of London sometimes gives members of the public the opportunity of handling both original and replica objects. Many armouries also put on demonstrations. For example, the Royal Armouries Museum in Leeds has a Craft Court where it is possible to see armourers, a leather-worker, and gunmakers at work using traditional techniques. These craftworkers make many of the replicas used in the museum during hands-on demonstrations. The museum also has a Tiltyard where performers put on exhibitions of military and sporting skills, such as jousts.



*Clothing made by leather-workers at Leeds Armoury is worn by staff members, such as the 17th-century-style buffcoat (left)*



## FIREARMS

Many national museums have collections of firearms. This wheel-lock, breech-loading pistol, on display at the Victoria and Albert Museum in London, England, was made by Hans Stockman in Dresden, c.1600.

## USEFUL WEBSITES

- For information on the English royal armouries: [www.armouries.org.uk](http://www.armouries.org.uk)
- National association of re-enactment societies: [www.nares.org](http://www.nares.org)
- For a virtual tour of the British Museum's collection: [www.thebritishmuseum.ac.uk/compass](http://www.thebritishmuseum.ac.uk/compass)
- For a virtual tour of the collections at the Met: [www.metmuseum.org/collections/](http://www.metmuseum.org/collections/)
- General site on arms and armour: [www.arador.com](http://www.arador.com)

## RE-ENACTMENT SOCIETIES

Many different groups in the United Kingdom, other European countries, and the United States, such as the Napoleonic Society, pictured below, re-enact scenes or battles from various periods in history. Other societies stage medieval combat or battles from the English Civil War. Find out if any are staging an event near you through the website listed in the box on the left.



## Places to visit

### ROYAL ARMOURIES MUSEUM, LEEDS, UK

Opened in 1996, this museum houses the United Kingdom's national collection of arms and armour. Highlights include:

- the Hall of Steel – an impressive, massed display of over 3,000 items of armour and military equipment
- an oriental gallery, which includes exhibits from the great Asian civilizations including the elephant armour pictured on page 65

### ROYAL ARMOURIES AT THE TOWER OF LONDON, UK

This armoury concentrates on the display of parts of the national collection of arms and armour relating to the Tower of London. It contains the most important collection of royal armour in Britain, including

- two of the armours made for Henry VIII
- armour worn by Charles I

### THE BRITISH MUSEUM, LONDON, UK

Includes many pieces of arms and armour, such as:

- weaponry from the Stone, Bronze, and Iron ages and from Roman Britain
- rare pieces, such as the iron helmet pictured below discovered in a burial mound at Sutton Hoo, Suffolk, England in 1939

### WALLACE COLLECTION, LONDON, UK

This private collection includes various items of armour and weapons, including full sets of samurai armour.

### NATIONAL WAR MUSEUM OF SCOTLAND, EDINBURGH CASTLE, UK

This extensive collection (and the Scottish national collection) includes firearms, bladed weapons, and staff weapons, plus swords from India and central Europe.

### HIGGINS ARMORY MUSEUM, WORCESTER, MASSACHUSETTS, USA

This museum has five floors displaying over 8,000 pieces of armour and weaponry. Different galleries are devoted to the tournament, hunting, ancient arms, and armour, the armourer's craft and arms and armour from around the world. There is also a combat wing.



Helmet found at Sutton Hoo, on display at the British Museum in London, England



# Glossary



Artilleryman

**ARMOURER** A metal-worker specializing in making armour; in Europe the craft of the armourer was regulated by a guild.

**ARQUEBUS** Originally, a kind of heavy matchlock gun; later, the word was used to mean a wheel-lock gun and, finally, a gun of fine workmanship rather than a common musket.

**ARTILLERY** Originally, "artillery" meant any machine used to throw stones and other missiles; later it was used for cannon.

**BASINET** Helmet, popular during the 14th century, some had a plate visor to protect the face. (see also VISOR)

**BAYONET** Blade designed to fit into or over a gun muzzle.

**BLUNDERBUSS** Short gun or pistol with a large bore and wide muzzle that fired a number of small shots.

**BOLT** Short, heavy arrow used with the crossbow; a bolt with a four-sided head was sometimes known as a quarrel. (see also CROSSBOW)

**BREECH-LOADER** Firearm loaded from the breech or back part of a gun, rather than the muzzle at the front.



Burgonet

**BROADSWORD** Heavy military sword with a wide, straight blade.

**BURGONET** Helmet originating in Burgundy, worn by cavalymen and infantry officers in the 16th century.

**CAVALRY** Mounted soldiers, often divided into two main groups – light cavalry (whose main tasks were scouting and pursuit of a beaten enemy), and heavy cavalry (used for shock impact: that is, charging in solid lines).

**CLAYMORE** Double-edged, two-hand broadsword with a long, heavy blade, used by Scottish Highlanders in the 15th and 16th centuries; means "great sword" from the Gaelic *claidheamh-mor*.

**COIF** Mail hood worn under a helmet.

**CROSSBOW** Popular weapon in medieval Europe, in which a cord was drawn back to shoot arrows called bolts or quarrels. Most crossbows were so powerful that mechanical means were needed to span or draw them.

**CUIRASS** Type of body armour comprising a breastplate and backplate worn together and usually fastened by straps or buckles; originally made of leather, then later of bronze, then steel.

**DUELLING PISTOL** High-quality, muzzle-loading pistol, usually supplied in a box as a pair, with accessories for making bullets, cleaning, and loading.

**DUELLING SWORD** Sword developed for duelling after people stopped carrying swords as part of daily life.

**FENCING** The art and skill of fighting with a rapier, developed in France and Italy in the early 17th century.

**FLAIL** Weapon in which an iron or wooden ball sometimes studded with spikes was attached to a haft, or handle, by a chain, or to a bar by a swivel. (see also MACE)

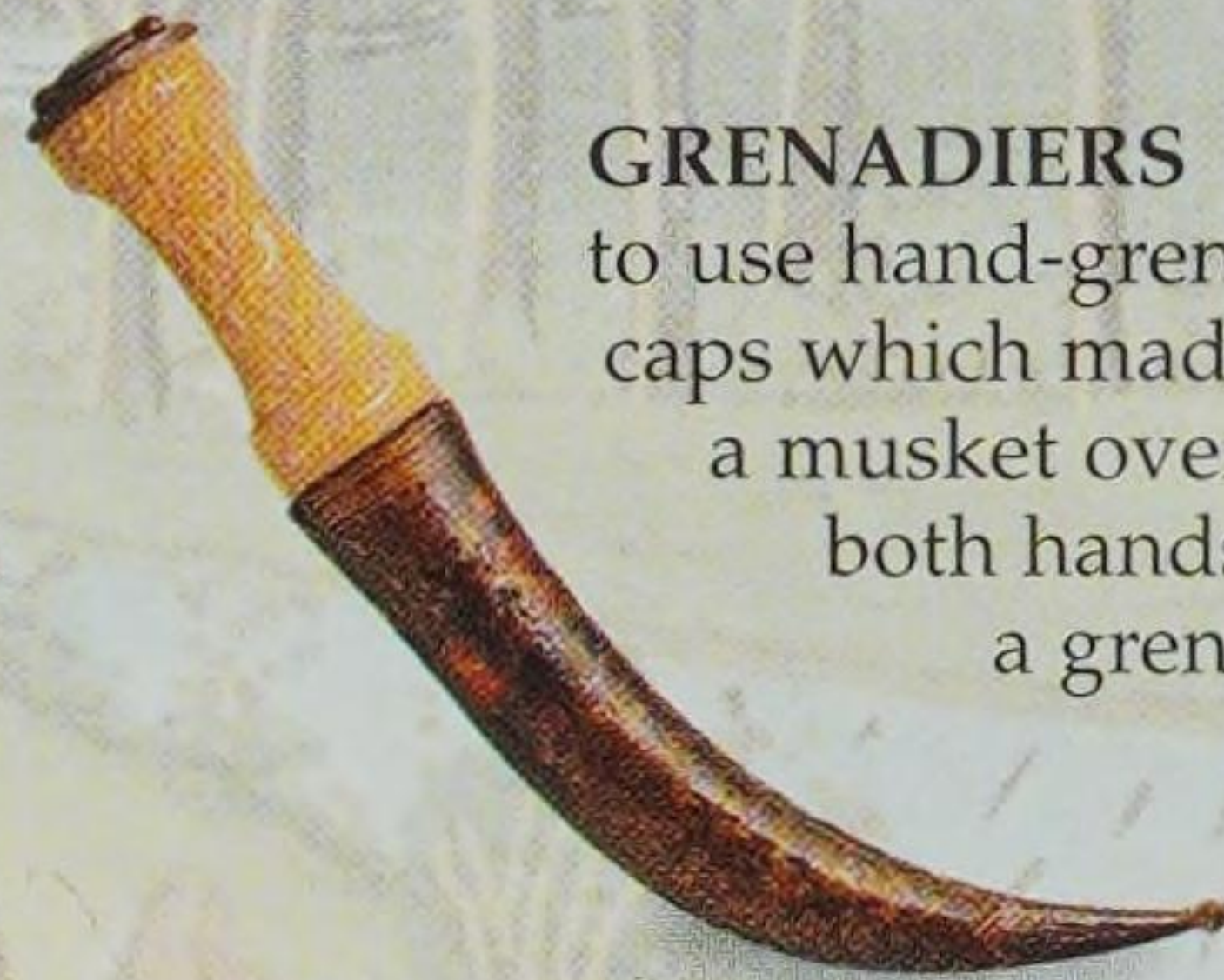
**FLINTLOCK** Type of gun invented in the late 1500s, in which flint is struck against a steel hammer, sending sparks into the priming powder and igniting the main charge; its lock had to be set to "full cock" before firing, making it safer to use.

**FULLER** Groove down the length of the sword to lighten the blade.

**GAUNTLET** Hand armour.

**GLADIUS** Short, double-edged thrusting sword used by Roman infantry.

**GREAVE** European armour for the lower leg, at first just for the shin but later also including a part to protect the calf.



Dagger

**GRENADIERS** Originally, troops trained to use hand-grenades; grenadiers wore low caps which made it easier for them to sling a musket over their shoulder, leaving both hands free to light and throw a grenade. By the 19th century, the word grenadier was used for ordinary infantry troops.

**GUILD** A medieval association that controlled and regulated a particular craft, such as armour-making. (see also PROOF)

**HALBERD** Kind of staff weapon made up of a long wooden handle mounted with an axe blade, backed by a hook, and topped by a spike.

**HAND-GRENADE** Hollow iron ball filled with explosive, threaded with a short fuse; the first hand-grenades came into use in the 17th century. (see also GRENADIERS)



Mempo

**HARAMAKI** Japanese cuirass worn by foot soldiers comprising a breastplate and skirts (called *kasazuri*) to protect the lower body.

**HARNESS** Full suit of armour.

**HAUBERK** Long tunic made of mail.

**HELM** Helmet that completely enclosed the head and face, usually cylindrical, used from the early 1200s.

**HILT** End of a sword made up of a grip to hold it, a pommel for balance, and (sometimes) a protective hand guard.

**INFANTRY** Foot soldiers.

**JOUST** Contest in a tournament in which two charging knights tried to dismount each other with lances. (see also TOURNAMENT)



**KABUTO** Japanese helmet.

**KATANA** Long fighting sword used by Japanese samurai.

**KRISS** Malaysian knife with a range of blade-shapes, hilts, and scabbards.

**LOGBOW** Tall, powerful bow used in Europe in the Middle Ages; usually made from one piece of shaped and honed yew, from the heartwood (which resists compression) and the sapwood (which resists tension), therefore forming a strong, natural spring.

**MACE** Weapon with a haft and a metal head. Some heads were spiked; others were ridged to penetrate armour. (see also FLAIL)

**MATCHLOCK** Gun with an early, simple kind of firing mechanism in which an S-shaped lever was pressed down to force a match into a flashpan which ignited the powder; later replaced by the flintlock.

**MAXIMILIAN ARMOUR** Name given to a style of 16th century plate armour with narrow fluting popular during the reign of Holy Roman Emperor, Maximilian I.

**MEMPO** Japanese face armour, some of which was decorated to resemble old men, demons or ghosts.

**MORION HELMET** Type of lightweight, open helmet often made of a single piece of steel with a broad brim and peak and cheekpieces; popular in the mid-16th century and worn mainly by infantry.

**MUSKET** Originally used to mean a matchlock gun which was fired from a rest (because of its weight). Later, the name came to mean any gun used by infantry.

**MUSKETEER** Infantry soldier armed with a musket.

**PAULDRON** Piece of European plate armour covering the shoulder.

**PAVISE** Large wooden shield used to protect archers and crossbowmen when loading and firing their weapons.



Guild marks from Umbria, Italy

**PERCUSSION LOCK** Form of ignition for both muzzle- and breech-loading firearms, introduced in the early 1800s, in which a hammer hits a detonating mixture that explodes and fires the bullet.

**PIKEMAN** Infantry soldier usually armed with a pike, or long spear, sword, and buckler (shield), and (in the 17th century) protected from musket fire by a morion helmet and cuirass.

**POMMEL** Rounded weight on the hilt of a sword to balance the sword blade; from the French word "pomme", meaning apple.

**PROOF** To test armour by firing a crossbow bolt at it from short range and later a musket; proofed pieces were sometimes stamped with the maker's or guild's mark.

**RAPIER** Sword with a sharp point, usually with a complex hilt covering the hand and bars protecting the knuckles.

**SABATON** Foot armour covering the upper side of the foot and secured by straps and/or laces.

**SHAFFRON** Armour for a horse's head.

**SHAMSHIR** Lightweight hunting sword originating in Persia; later called a scimitar.

**SMALLSWORD** Light form of the rapier, with a triangular blade designed for thrusting; used from the late 1600s until the late 1700s when they were known as "town" or "walking" swords because they were mostly used as fashion accessories.

**SPUR** Point fitted to the heel of a rider used to speed up a horse; often seen as the badge of knighthood (from the saying "when a knight won his spurs").

**STILETTO** Small dagger with a slender blade designed for thrusting.

**TILT** Barrier introduced in the 15th century to separate jousting knights.

**TOURNAMENT** Mock fight originally to train men for war; later became a display of fighting skills with complex rules; included the tourney or *melee* (between two groups that fought on horseback), the joust, and, later, the foot combat.



Shaffron

**TSUBA** Japanese sword guard.

**TULWAR** Curved Indian sword.

**VAMBRACE** European plate armour worn on the arm.

**VISOR** Protective armour for the face, introduced around 1300, which was hinged and could be swung up. Some visors could be detached from the helmet for cleaning or for repair. (see also HELMET)

**WAKIZASHI** Short Japanese sword used as a second fighting sword by a samurai warrior (after the *katana*).

**WHEEL-LOCK** Gun with a later form of ignition than the matchlock, in which sparks from a spinning wheel were showered into the pan, thereby setting off the charge; the wheel-lock was later replaced by the flintlock. (see also FLINTLOCK)

**WINDLASS** Mechanism with pulleys and handles that fitted over the butt of a crossbow, enabling the crossbow's cord to be wound back tightly, ready for shooting. (see also CROSSBOW)



Jousting knights



# Index

## A

Aborigines, weapons of, 8-9  
 American Indians, weapons of, 62-3  
 American War of Independence, 41  
 American West, weapons of, 60-1  
 Anglo-Saxons, weapons of, 14  
 Apache pistol, 51  
 archers, 6, 15, 18, 20, 21, 28  
 armour, 12-13, 14, 15, 17, 24-5, 26-7, 28-9, 30-1, 32-3, 36, 37, 39, 50, 65  
 armourer's workshop, 18, 25  
 armouries, 68, 69  
 arrows: flint, 10;  
 incendiary, 21; Indian, 3;  
 longbow 18-21; Norman, 15; North American Indian, 63; poisoned, 9  
 Arthur, King, 16, 67  
 assassin's pistol, 58  
 axes, 22-3; battle-axes, 24-5; Bronze Age, 10;  
 Igorot, 23; Indian, 23, 32;  
 Naga, 22-3; stabbing, 22;  
 Stone Age, 6,7; throwing, 9, Viking, 15, 64  
 Aztec dagger, 22

## B

backwords, 44  
 basinet, 28, 29, 70  
 battle-axe pistol, 23  
 Bayeux tapestry, 14, 15  
 bayonets, 40-1, 48, 51, 70  
 blunderbuss, 48-9, 70  
 bolts, crossbows, 20-1, 70  
 boomerangs, 8-9  
 bow case, 62-3  
 bowie knife, 22, 23, 68  
 bows: crossbows, 2-3, 18-21, 64, 70;  
 longbows, 18-21, 64, 65, 71; North American Indian, 62-3; shortbows, 8, 9, 19  
 bracelet, spiked iron, 4  
 breastplates, 25, 26, 33, 39  
 broadswords, 17, 43, 44-5  
 Bronze Age, weapons of, 10-11  
 Brown Bess muskets, 40-1

Buffalo Bill, 60, 67  
 bullet crossbow, 20  
 bullets, 3, 46, 56, 57, 59, 65  
 bullet moulds, 3, 46, 57, 59  
 bullseye lantern, 54

## C

carbine, 41  
 cartridge pouch, 40  
 cartridges, 3, 40, 56, 57, 59, 60, 61  
 Celts, weapons of, 10-11  
*chakram*, 35  
 Chinese sword, 4  
*cinquede*, 16-17  
 claymore, Scottish, 16-17, 70  
 close-helmets, 28  
 clubs, 8, 63  
 coats of arms, 30  
 Colt revolvers, 58, 59, 60-61, 66  
 comb-morion helmet, 27-28  
 combination pistol, 59  
 crossbows, 2-3, 18-21, 64, 70  
 "crow-bill" war pick, 4  
 "crow's feet" (caltrops), 50  
 cuirasses, 13, 26, 27, 33, 36, 70  
 cutlery pistols, 50

## D

daggers, 2, 22-3; African, 4; Bronze Age, 11; Indian, 32, 34, 35, 50-1; Iron Age, 11; Japanese, 36;  
 parrying, 43-4;  
 Roman, 12  
 Dark Ages, 14-15  
 Deringer, Henry, 61, 66  
 Derringer pistols, 57, 61  
 dirk, midshipman's, 50-1  
*Don Quixote*, 31  
 duelling pistols, 46-7, 70  
 duelling swords, 42-5, 70

## EF

executioner's axe, 22  
 fakir's horns, 50-1  
 fencing, 42-5  
 flails, 51, 70  
 flint weapons, 6, 10  
 flintlocks, 2, 38, 40-1, 46-7, 52-3, 55, 58, 59, 70;  
 blunderbuss, 48-49, 70;  
 grenade launcher, 52-3

folding-knife, Spanish, 22-3  
 "fowling piece", 40, 55

## G

gaunlets, 2, 25, 27, 36, 70  
 gladiators, Roman, 13  
 goat's foot lever, 18-19  
 gorgets, 26, 50  
 Greeks, armour and weapons of, 12  
 grenade launcher, 52-3  
 grenades, 52-3, 70  
 grenadiers, 52, 70  
 grenadier's pouch, 52  
 gunbelt, 60  
 gunpowder, 3, 38, 39, 46, 65  
 Ghurka knife (*kukri*), 50

## HI

halberd, 10, 70  
 hand-axes, 6-7  
 handcuffs, 55  
 hangers, 16-17  
 hats: bicorne, 55; iron, 29;  
 shako, 53; tricorn, 49  
 helmets, 28-9; Anglo-Saxon, 14; Bronze Age, 11; Greek, 12; Indian, 33;  
 Iron Age, 11; Japanese, 36, 37; medieval, 26;  
 Roman, 12, 13; tilting, 30  
 helms, 28-9, 70  
*Hiawatha*, 62  
 highwaymen, 48-9  
 holster pistols, 41, 49  
 holster, 60  
 horse armour, 30-1, 65  
 hunting swords, 2, 16-17, 44-5  
*Iliad*, The, 12  
 incendiary arrow, 21  
 India, armour and weapons from, 3, 4, 5, 32-5, 50, 51  
 Iron Age, weapons of, 10-11

## JK

Japan, armour and weapons from, 36-7  
 jousts, 64, 70  
 Kentucky rifle, 41  
 kettle-hat, 29  
 knights, 15, 17, 24-5, 26-7, 28-9, 30-31, 64, 65  
 knives, 22-3, African throwing, 9, 22; Ghurka,

50; Indian, 3; North American Indian, 62;  
 Sudanese, 4, 23  
 knuckleduster, Indian, 5

## L

lances, 8, 15, 31  
 lantern, bullseye, 54  
 Le Bourgeois, Martin, 40  
 Le Mat revolver, 57  
 Long John Silver, 40  
 longbows, 18-21, 64, 71

## M

maces, 31, 50, 64, 71  
 mail armour, 15, 24, 33  
 Malay dagger (kris), 23  
 masks: American Indian, 62; Japanese, 37;  
 tilting, 30;  
 matchlocks, 33, 34, 35, 38-9, 64, 71  
 miquelet lock, 58-9  
 missile weapons, 8-9  
 Moguls, weapons of, 32, 34  
 Mongols, 64  
 muff pistol, 59  
 musketeer, 39, 70  
 muskets, 52, 65, 71;  
 flintlock, 38, 40-1, 70;  
 matchlock, 33, 34, 35, 38-9, 71  
 muzzle-loading guns, 38, 39, 46, 56

## NO

Napoleon Bonaparte, 52, 53, 67  
 Normans, 14-15, 67  
 "over-and-under" pistol, 59

## P

Palaeolithic Age, weapons of, 6-7  
 parrying daggers, 43-4  
 parrying shield, 8-9  
 pavises, 20, 21, 70  
 pepperbox revolvers, 2, 58  
 percussions revolvers, 56-7, 58  
 Persia, armour and weapons of, 32  
 pinfire revolver, 3, 59  
 pistols, 58-59, 64; Apache, 51; battle-axe, 23;

combination, 59;  
 cutlery, 50; Derringer, 57, 61; duelling, 46-7;  
 holster, 41, 48-9;  
 Howdah, 3; "over-and-under", 59; pocket, 2, 57, 59; Remington, 66;  
 sword, 41; "Tower", 2; wheel-lock, 38, 39, 71  
 plate armour, 24-7, 65  
 plug bayonet, 51  
 poacher's gun, 55  
 pocket pistols, 2, 57, 59  
 police, equipment and weapons, 54-5  
 pot, "lobster-tailed", 29  
 powder flasks, 35, 39, 46, 57

## QR

quivers, 19, 62  
 quoit, Indian (*chakram*), 34-5  
 ramrods, 38-9, 46  
 rapiers, 2, 42-5, 64, 71  
 rattles, police, 54  
 revolvers, 3, 56-7, 58-9, 60-1  
 rifles, 41, 60-1  
 ring knife, 22  
 Robin Hood, 19, 67  
 Romans, armour and weapons of, 12-13

## S

sabatons, 25, 27, 71  
 sabres, 32-3, 44, 52-3  
 samurai, Japanese, 36-7  
 scabbards: bayonet, 41;  
 Indian, 33; Japanese, 36;  
 Roman, 12  
 scimitars, 17, 32  
*sergent de ville*, 55  
 Sherlock Holmes, 56  
 shields, 11, 20; Indian, 32-3, 34-5; parrying, 8-9; pavise, 20, 21, 71  
 shotgun, percussion, 57  
 Sitting Bull, 60  
 slings, 9  
 smallswords, 42-5  
 Smith and Wesson revolver, 61  
 spanning levers, for crossbows, 18-19, 20  
 spears: Aborigine, 9  
 Bronze Age, 10, 11;  
 Japanese, 36; Roman, 13;  
 Saxon, 14; Stone Age, 7  
 spurs: Norman, 15;  
 tilting, 30  
 stiletto, gunner's, 50-1

Stone Age, weapons of, 6-7  
 sword cutler's shop, 44  
 sword pistol, 41  
 swords, 16-17, 42-5, 65;  
 Anglo-Saxon, 14-15;  
 Assyrian, 8; backsword, 44-45; boy's, 50-1, 65;  
 broadsword, 43, 44-45;  
 Bronze Age, 10-11, 65;  
 cavalry, 53; claymore, 16-17, 70; Chinese, 4;  
 cuirassier's, 53; dirk, 51;  
 duelling, 42-5, 70;  
 hanger, 16-17; hunting, 2, 16-17, 44-45; Indian, 34; Japanese, 36-7, 66;  
 pistol, 41; police, 54-55;  
 rapier, 42-5, 71; Robe sword, 2; Roman, 12;  
 sabre, 32-3, 44, 52-3;  
 smallswords, 42, 43, 44-5, 71; two-hand, 16-17; Viking, 14-15

## TU

*The Three Musketeers*, 42  
 throwing axe, 9  
 throwing club, 8  
 throwing knives, African, 8-9, 22  
 thrusting dagger, Indian (*katar*), 35  
 Tiger claw, 5  
 tilting armour, 30-1  
 tipstaff, 55  
 tomahawks, 62-3  
 tournaments, 25, 30-1, 64, 71  
 transitional revolver, 58-9  
 Tranter revolver, 56-7  
 triggers, duelling pistols, 46  
 truncheon, 55  
 Turpin, Dick, 49

## VW

Vikings, weapons of, 14-15, 64  
 visor, 26, 28, 71  
 war hammers, 3, 25  
 war pick, 4  
 wheel-lock pistols, 38-9, 64, 69, 71  
 whistle, police, 54-5  
 William Tell, 21, 67  
 Winchester rifles, 60-1  
 windlass, 18-19, 71  
 wrist knife, 23

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 Gettysburg National Military Park: 66br.  
 Giraudon: 43tl.  
 Goteborg Museum of Art: 39c.  
 India Office Library (British Library): 33t.  
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 Michael Holford: 12bl, 15t, c, b; 32b; 36-37t; 63t  
 Museum of London: 65br.  
 National Army Museum: 53t.  
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 Rex Features: 65bc.  
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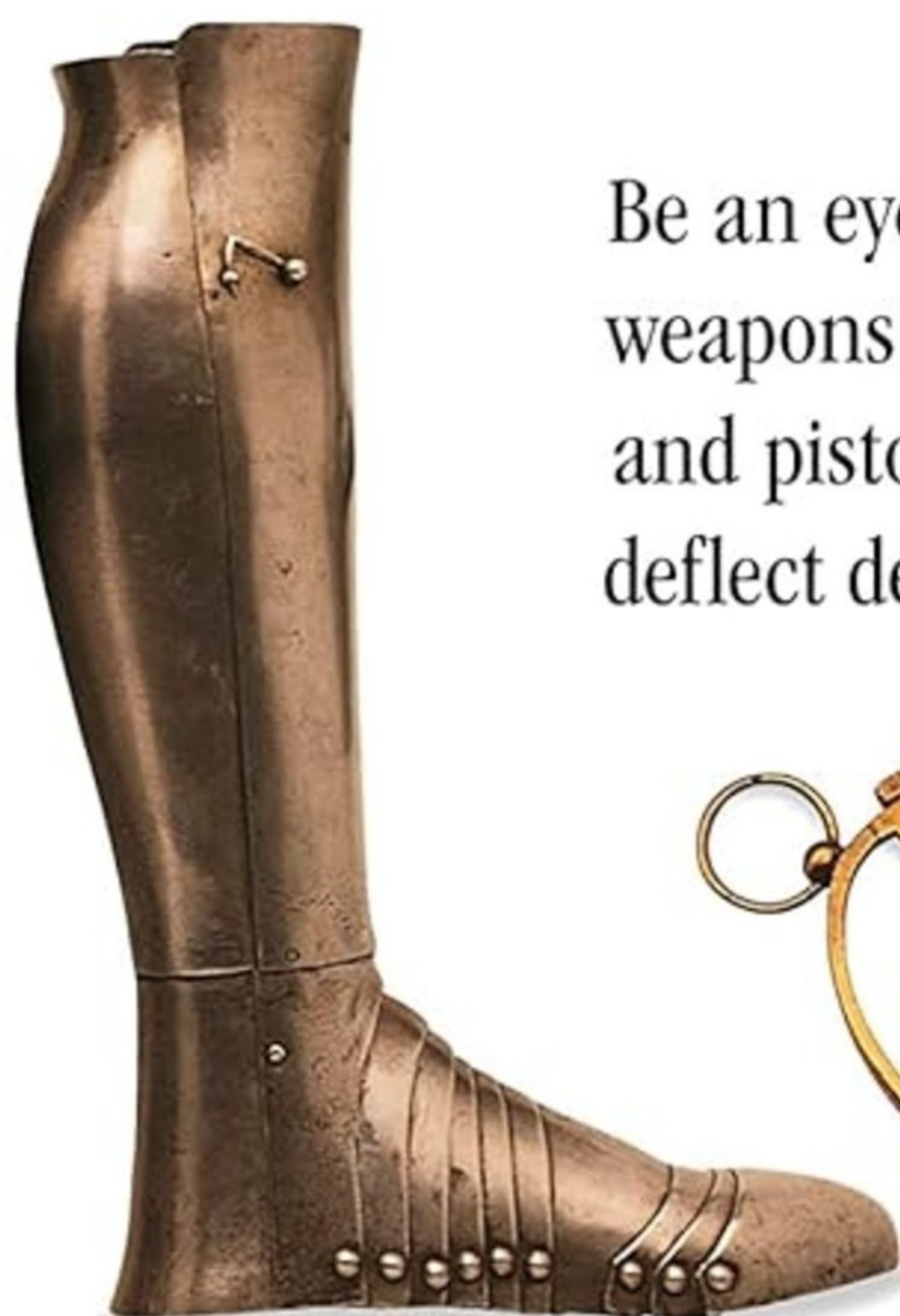
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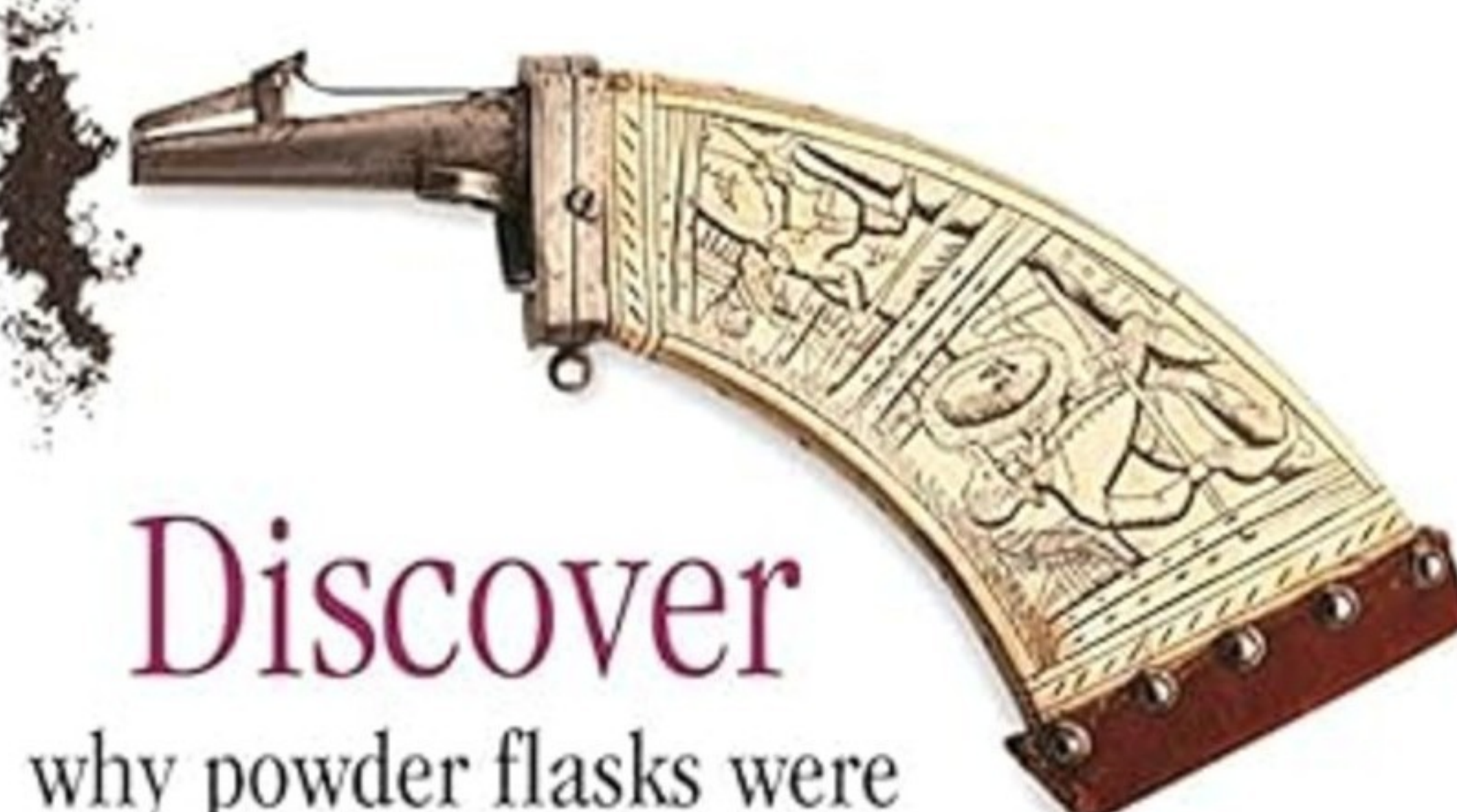
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